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In This Issue

- Eastern U.S. Wilderness
- 8th World Wilderness Congress
- Minimizing nonconforming uses
- Madagascar

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FEATURES

STEWARDSHIP

SCIENCE AND RESEARCH

PERSPECTIVES FROM THE ALDO LEOPOLD WILDERNESS RESEARCH INSTITUTE

EDUCATION AND COMMUNICATION

INTERNATIONAL PERSPECTIVES

WILDERNESS DIGEST

FRONT COVER The magnificent El Carmen escaprment, one of the the "sky islands" of Coahuilo, Mexico. Photo by Patricio Robles Gil/Sierra Madre.

INSET Ancient grain grinding site, Maderas del Carmen, Coahuilo, Mexico. Photo by Vance G. Martin.

International Journal of Wilderness

The *International Journal of Wilderness* links wilderness professionals, scientists, educators, environmentalists, and interested citizens worldwide with a forum for reporting and discussing wilderness ideas and events; inspirational ideas; planning, management, and allocation strategies; education; and research and policy aspects of wilderness stewardship.

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EDITORIAL PERSPECTIVES

Is Eastern Wilderness "Real"?

BY REBECCA ORESKES

Lately I've been at several meetings or events and listened to people talk about "real" wilderness. They were making a distinction between what they saw as large, wild areas with few people both in the western United States and elsewhere, versus wilderness in the East, areas surrounded by human populations, long ago impacted by human use. These are smaller areas, usually struggling to find a semblance of balance between human use and the idea of self-willed land.

It reminded me of when people talk about "real jobs." After working seasonally for many years, in the mountains, on farms, as a cross-country ski patrol, it took me a long time to get a "real job," which I understood to be one with benefits and year-round commitments. Once I got one of those jobs it didn't seem any more or less "real" to me. I guess I never have quite understood the distinction.

The references to "real" wilderness got my head spinning. I did what I usually do when my mind is spinning: I took a walk in wilderness. Eastern wilderness. I walked by myself, getting wet from rain-soaked trees and grasses that overhung the trail, past moose tracks and marten scat, by a free-flowing river that sang not for my benefit but because of its own nature. It all seemed pretty real to me.

The area I walked in, as is the case with many eastern wildernesses, was not untouched by humans. It had been logged; railroads had once crisscrossed its landscape, although most people could not tell today. In the history of the landscape, people had made a choice to move from exploitation to protection. Humans had made a conscious choice to change their relationship with the land.

The East is in many ways where the U.S. National Wilderness Preservation System was born. From Bob Marshall's roots in the Adirondacks, to Howard Zanhiser's cabin in the Adirondack woods where he created the Wilderness Act, the eastern United States has helped forge the nation's wilderness ethic. In those early years of the wilderness movement, the East served as a cautionary tale against rampant exploitation. Now, eastern wilderness symbolizes that some recovery can come with careful stewardship. The East continues to be filled with wilderness stewardship challenges. Still, amidst a rising population and increasing impacts to the natural environment, islands of wilderness represent our changing relationship to the land.

This issue focuses on and celebrates wilderness stewardship in the eastern United States and around the world, from Doug Scott's history of wilderness designation to a discussion of how Madagascar proposes to address some of its wilderness stewardship dilemmas. This issue is full of tales about the struggles of designating and caring for wilderness and attests to the rich history of people and their relationship to wilderness. Eastern wilderness certainly seems real to me—and to the millions of people who live near it. After all, our relationship with the land is as real and as meaningful as we make it. **IJW**

SOUL OF THE WILDERNESS

Florida Wilderness

Working with Traditional Tools after a Hurricane

BY SUSAN JENKINS

Clearing up after one hurricane is an immense task. Clearing up after three hurricanes—hurricanes Charley, Frances, and Jeanne—can seem insurmountable. In November of 2004, the national forests in Florida requested assistance from wilderness and traditional tools experts throughout the Forest Service. An assessment team was assembled to determine the best and most sensitive approach to reopening the Florida National Scenic Trail and Juniper Run through some of the most unique and protected habitats in Florida. Despite the dangerous conditions posed by hundreds of downed trees along the trail and in the waters of the run, the team was tasked with devising a safe plan that would not require the use of any motorized or mechanized equipment in accordance with the values detailed in the Wilderness Act of 1964. The team was highly successful. Not only were the Florida National Scenic Trail and Juniper Run safely reopened, but traditional tool skills that were instrumental in the settlement of Florida long ago were rejuvenated and found to be just as useful and relevant today as they were in our past. The following article is a firsthand account and interpretation of the effort as written by recovery team member Susan Jenkins, a wilderness ranger from Idaho who came to Florida to participate in the work.

—Michelle Mitchell, USDA Forest Service, National Forests in Florida

January comes in cold and damp on the Florida National Scenic Trail and the Juniper Springs Canoe Run. Both are found in the Juniper Prairie Wilderness on the Ocala National Forest. It is a different world here. The mornings are freezing but the day quickly warms. Walking along the tall grasses, we are soaked with sweat. The 75-degree weather feels stifling, and the humidity soaks us as though we are breathing under tepid water. It is not even hot or really humid yet.

Days later we are jumping out of canoes into swamp muck to our chests. We are too cold to rest during the day. Methane gases bubble up and the stench is … interesting. Our frustration mounts when saws bind repeatedly as embedded sand in both oak and bay trees dull the cutting teeth. In the middle of the run the tension and binds within the trees change as the current pulls the limbs back and forth as we saw beneath the surface. We can't even saw into the palms as the pith repeatedly pinches the steel. Our sharpened axes chip and ring as they strike the downed oaks covering the trail and waterways. At the end of the day, we have traveled less than a hundred yards. But this is a unique chance to see the amazingly different country.

There is no doubt that this is a beautiful and unique place. As we travel from one end of the wilderness to the other, we encounter a landscape shifting from small ponds and lakes to swamps, runs, and prairies. Vegetation varies as this complex countryside changes from hardwood to longleaf islands historically shaped by fire. The Juniper Canoe Run is canopied by live oaks with Spanish moss hanging from its branches. As we work to clear the waterway, alligators and water moccasins become a daily happening that takes a while to get used to. There are tick checks at night, and the chiggers and mosquitoes are biting every warm evening.

Different and incredibly beautiful. Many of us work between two large wildernesses encompassing 3 million acres (1.2 million ha) with one gravel road between them. But this country becomes more valuable as there is so little left. In a single afternoon we drive around the entire perimeter of the Juniper Prairie Wilderness. You have so

many visitors, and there is not much wildland remaining. … How do you plan and deal with the management decisions needed to preserve something so unique? It is easy for any of us to see why people come from as far away as Venezuela and Germany to be a part of the Florida Trail Association's efforts to work in this wilderness.

Outdoor enthusiasts and winter hikers are aware of the destruction hurricanes Charley, Frances, Jean, and Ivan inflicted on nearly all segments of the Florida National Scenic Trail (Florida Trail). In October, after the last of the storms had passed, it was estimated that 80% of the 1,400-mile trail (2,258 kilometers) was either closed or under assessment for damages. But the volunteers and land managers that care for this trail are innovative and dedicated. Despite having to deal with repairs to their own homes and property as a result of the storms, people came out in force to rebuild sections of the trail and remove blowdown that blocked trail access. In four months, volunteers from the many different chapters of the Florida Trail Association (FTA) had cleared most of the trail. Bridges, boardwalks, and campsites were cleaned and repaired.

The nine-mile (14.5 km) section of the Florida Trail within the Juniper Wilderness called for some creative thinking and problem solving. This is the only section of the Florida Trail passing through designated wilderness that was affected by the hurricanes. Trail users, volunteers, and land managers realize that the Juniper Prairie is a rare setting in Florida's national forests. And, like the wilderness areas in the western states, a different type of management approach is called for. The use of traditional (non motorized) tools has been a keystone for managing wilderness since 1964, when the Wilderness Act was enacted. One of the most positive outcomes of its passage is that certain skills that may otherwise have vanished have been kept alive. This is one of the benefits of wilderness.

Some individuals believed that using traditional tools would not be a viable alternative when reopening the impacted trails and canoe runs. Others saw the recovery efforts in a different light. This was an opportunity to reopen the trails and canoe runs and to revitalize skills that had not been a part of the maintenance of the Florida Trail for many years. Florida's forest-related culture is filled with examples of traditional tool use. Crosscut saws, axes, and rigging equipment such as hoists and winches figured strongly into logging operations, road and trail construction, and the building of structures. The Wilderness Act requires the use of nonmotorized means in designated wilderness except in fire-related emergencies, law enforcement, and medical emergency situations. We tried to develop an educational context and recovery plan that allowed for the work to be accomplished safely and efficiently while fully meeting the directives of the act.

In other places, we sometimes encounter resistance to the use of hand tools as a means of performing trail maintenance for accomplishing trail and restoration work. Many people believe that chain saws and motorized rock drills are the only effective means for opening and reconstructing mountain pathways. Our work in Florida has been viewed in a different light. And the feedback we received from managers and wilderness visitors will increase our resolve when we return to our jobs out west.

As we visited with hikers from Florida and all over the world while cutting the hiking trails, we were overwhelmed with the positive responses. People told us how important it was to know that traditional hand-tool skills are still alive, and many quickly developed an emotional involvement in just knowing that these means are being used to accomplish the jobs at hand. As often happens, when complex recovery projects are initially laid out, individuals look at the sheer amount of work to be done. Many compare tool options for the job rather than comparing the tools within the context of the work to be done.

Figure 1—Florida Trail Association members Megan Griffin and Sara Griffin of Tallahassee demonstrate one way to use the crosscut saw with the help of Dr. Don Jastad. Photo courtesy of Florida Trail Association.

A chain saw is definitely faster and easier to use than a crosscut saw. However, in the heavy blowdown that we have encountered from high winds, we have seen that only a small percentage of the work involves sawing. Most of the job lies in moving the materials after the sawing has been finished. In addition to working within Juniper Prairie Wilderness, our crews were asked to clear downed trees from the nonwilderness portions of Alexander Canoe Run where chain saws are a viable method for accomplishing work. We brought power saws along, but we were unable to use them effectively, as most of the sawing had to be done under water in order to clear the run to a depth allowing for outboard motors. We quickly returned to hand tools and cleared the run in a few days.

Initial examination of the Florida Trail and Juniper Canoe Run showed impacts from the hurricanes that seemed horrendous, with trees piled into huge jackstraws. With a seemingly

Figure 2—Juniper Springs run in the Juniper Prairie Wilderness located in Florida (USDA Forest Service). Photo by Deborah Caffin.

overwhelming task ahead, a recovery program was put in motion. Land managers from the national forests in Florida and the Nez Perce and Clearwater National Forests in Idaho designed a plan to promote stronger partnerships among local forests, historical societies, and the FTA in order to complete the work in an economic fashion. Long-term plans were developed to promote these partnerships and cooperation into the future.

Upon arrival in Florida, tool trainers from the western regions of the U.S. Forest Service met with local land management employees and volunteers to embark on a four-day training program with classroom and practical sessions. Learning about traditional tools is more than just learning how to swing an ax or run a saw in the woods. Good tool usage is part skill and physical ability, but efficient work takes place when planning and layout are present in the working process.

The practical sessions were designed to let everyone involved learn how to use the hand tools and rigging equipment to their full advantage. Participants quickly understood that traditional crosscut saw and ax skills along with skyline logging techniques will continue to play an important part in trail and bridge maintenance and restoration in backcountry areas. With a never-ending need to continue trail maintenance, there will be plenty of time to perfect technique.

The training was geared toward teaching and reviving skills; however, it was also about learning how these tools coupled with unlimited imagination can be used to solve all sorts of trail construction and reconstruction problems in the backcountry. As trainers, the best feedback we can receive is seeing ideas and thoughts taking root in participants. By the end of the training, what began as a four-day session stretched into five, and FTA volunteers from around the state began to reevaluate methods of construction for future Florida National Scenic Trail projects using the traditional tool skills they had learned. **IJW**

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From BIODIVERSITY HOTSPOT on page 45

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A Truly National Wilderness Preservation System

BY DOUGLAS W. SCOTT

Today the National Wilderness Preservation System includes 166 units east of the Rocky Mountains, comprising some 4,245,000 acres (1.7 million hectares)—nearly 9% of all designated wilderness in the 49 states other than Alaska (www.wilderness.net, accessed April 8, 2005). In this article, "east" means the half of the continental United States east of the Rockies and embraces a wide variety of forest types, prairie grasslands, wetlands, and swamps.

Those who conceived and enacted the Wilderness Act envisioned a single system of areas held to one definition and stewardship mandate nationwide. They laid down two fundamental ideas:

1. Wilderness areas will be diverse in size and wildness. In Aldo Leopold's words, "In any practical [wilderness] program the unit areas to be preserved must vary greatly in size and in degree of wildness" (Leopold 1949, p. 189).

2. The defining concept of wilderness was never some ideal of pure, virgin nature. The framers of our national wilderness policy welcomed opportunities to preserve such areas, but their wilderness definition embraces lands with past human impacts. One founder of The Wilderness Society, Harvey Broome, wrote to Peter J. Hanlon on May 18, 1962: "A wild area is not necessarily a virgin area, but is one without roads and mechanized means of transportation… ." (The Wilderness Society archives, Western History Collection, Denver Public Library). Broome was addressing the suitability of the Shining Rock Wilderness (North Carolina), now a unit of the wilderness system.

In 1947, leaders of The Wilderness Society set in motion the campaign that led to the enactment of the Wilderness Act. Howard Zahniser, the society's executive director, drafted the legislation. As first introduced in 1956, the bill named each federal land unit involved. Later, generic language replaced this long list of forest, park, and refuge units, but the original list demonstrates that the sponsors always intended a nationwide wilderness system. The list included the U.S. Forest Service (USFS)–administered Boundary Waters Canoe Area (Minnesota) and Linville Gorge (North Carolina); national wildlife refuges, including Moosehorn (Maine), Okefenokee Swamp (Georgia), and Wichita Mountains (Oklahoma); and national park areas, including Everglades (Florida), Great Smoky Mountains (Tennessee and Georgia), and Shenandoah (Virginia) (U.S. Senate, 1956). All involved were aware that these and other eastern units involved lands disturbed by past human impacts.

During Senate debate, Senator Thomas Kuchel (R-CA), responded to concern that there would be reason:

> for fear or trepidation on the part of Senators representing Eastern States that forest areas within their States … could not … become a part of the wilderness system. I deny it. … If the distinguished senior Senator from

Figure 1—Great Swamp National Wildlife Refuge Wilderness in New Jersey (Fish & Wildlife Service). Photo by Robert Johnson.

> Florida wishes to introduce proposed legislation creating a wilderness out of any of the area owned by the Government of the United States in his own State, let him do so. … That would be precisely what would be required of him if the proposed wilderness legislation were enacted into law. (Kuchel 1961, p.16919)

Figure 2—Aerial view of Cedar Keys Wilderness in Florida (Fish & Wildlife Service). Photo courtesy of Fish & Wildlife Service.

Figure 3—Lye Brook Wilderness in Vermont (USDA Forest Service). Photo by John Romanowski.

Senator Kuchel spoke with particular authority as one of the 10 original cosponsors of the wilderness bill in June 1956, the second most senior Republican member of the Committee on Interior and Insular Affairs, which approved the bill in 1961, and the committee's most senior Republican when it reapproved the bill in 1963.

In its final form, the law immediately designated four eastern areas, including the Shining Rock Wilderness (North Carolina) that the Forest Service established administratively in May 1964. The entire area showed fading evidence of extensive railroad logging and slash fires that occurred between 1906 and 1926 (USFS 1993). After visiting the area, Harvey Broome, then president of The Wilderness Society, wrote to Peter J. Hanlon on May 18, 1962:

> The fact that it has been cut-over and burned-over is unfortunate, but areas of this size are limited in number in the east and … it is desirable to set such aside as there is opportunity. … The need is so great in the east and southeast that it is fortunate that Shining Rock is being considered … and in fifty or one hundred years it will reach a high degree of restoration. (The Wilderness Society archives, Western History Collection, Denver Public Library)

In including this and the other wilderness areas immediately designated in the act, the floor leader in the House of Representatives noted that his "committee, in effect, was reviewing each of these areas individually" (Aspinall 1964, p. 16846), finding that each had been defined with precision and met all of the criteria of the soon-to-be-enacted law—including areas in both the East and West that had a history of earlier human impacts. As the House of Representatives debated the Wilderness Act, Shining Rock was included in a tabulation of the acreage of the wilderness areas to be immediately protected. Chairman Aspinall characterized these areas, which became statutorily designated wilderness in the 1964 act, as having been "administratively designated as having wilderness characteristics." He explained how closely his committee reviewed these new areas before approving them:

> Parenthetically, I note for the record that 2 years ago when our Committee on Interior and Insular Affairs was considering wilderness legislation there were only 6,822,400 acres of land [administratively] designated as "wilderness," "wild" and "canoe" and that the increase of 2,317,321 acres that has taken place since then has been accomplished by the Department of Agriculture after coordination with the Committee on Interior and Insular Affairs." (Aspinall 1964, p. 16,846)

The framers of the Wilderness Act designed a practical law applicable to the realities of land use history. Senator Clinton P. Anderson (D-NM), lead sponsor of the Wilderness Act and chairman of the Senate committee, carefully explained the two-sentence definition:

> The first sentence is a definition of pure wilderness areas, where "the earth and its community of life are untrammeled by man." … *It states the ideal.* The second sentence defines the meaning or nature of an area of wilderness as used in the proposed act: A substantial area retaining its primeval character, without permanent improvements, which is to be protected and managed so man's works are "substantially unnoticeable." *The second of these definitions of the term, giving the meaning used in the act, is somewhat less "severe" or "pure" than the first.*" (Anderson 1961, p. 2), emphasis added.

In 1964, eastern areas qualified as wilderness according to both the Forest Service and Congress. Yet six years later the agency opposed congressional designation of new wilderness areas in West Virginia with similar land use histories of decades-old logging. In 1971 the USFS associate chief speaking before the Sierra Club's Biennial Wilderness Conference on September 24 noted that "areas with wilderness characteristics as defined in the Wilderness Act are virtually all in the West" (Roth 1988, p. 39). For its own political reasons, the agency hierarchy adopted a new "purity" interpretation—that no land with a history of human disturbance, east or west, could qualify as wilderness. This purity interpretation was consciously evolved by agency leaders (Costley 1972).

The USFS quietly drafted an alternative to the Wilderness Act to establish a system of wild areas within the land of the national forest system and peddled it on Capitol Hill. Their bill (S. 3699, 92nd Congress, 2nd session) was described as necessary because eastern areas "do not meet the strict criteria of the Wilderness Act" (Aiken 1972, p. 20570). Members of Congress who championed the Wilderness Act resolved to turn back this misinterpretation. Representative John Saylor (R-PA), lead sponsor of the Wilderness Act in the House, challenged those:

> who tell us [the act] is too narrow, too rigid, and too pure in its qualifying standards to allow any formerly abused lands or lands with present abuse that can be restored with time. I fought too long and too hard, and too many good people in this House and across this land fought with me, to see the Wilderness Act denied application … by this kind of obtuse or hostile misinterpretation or misconstruction of the public law and the intent of the Congress of the United States. (Saylor 1973, p. 849)

Senator Henry Jackson (D-WA) warned his colleagues that

> a serious and fundamental misinterpretation of the Wilderness Act has recently gained some credence, thus creating a real danger to the objective of securing a truly national wilderness preservation system. It is my hope to correct this false so-called "purity theory" which threatens the strength and broad application of the Wilderness Act. (Jackson 1973, p. 754)

Senator Frank Church (D-ID), leader of the Senate debate on the Wilderness Act, observed that "the effect of such an interpretation would be to automatically disqualify almost everything, for few if any lands on this continent—or any other—have escaped man's imprint to some degree" (Church 1973a, p. S737). Church pointed out that the Wilderness Act itself "placed three eastern areas into the National Wilderness Preservation System [that] … had a former history of some past land abuse," explaining, "This was by no means a so-called grandfathering arrangement. It was, and is, a standing and intentional precedent to encourage such areas to be found and designated under the act in other eastern locations" (Church 1973a, p. S738).

In launching their purity interpretation, the Forest Service hierarchy was out of step with the other agencies working correctly under the Wilderness Act criteria. Presidents recommended new wilderness areas in national parks and national wildlife refuges in the East, and Congress steadily added these areas to the wilderness system—lands with a history of land use impacts, such as refuge wilderness areas, including Great Swamp (New Jersey, 1968), Seney (Michigan, 1970), and Wichita Mountains (Oklahoma, 1970).

Figure 4—"Snowshoer" on Baker Peak in Big Branch Wilderness in Vermont (USDA Forest Service). Photo by George Wuerthner.

Wilderness advocates and their congressional allies responded to the Forest Service legislation with a counter bill, the proposed Eastern Wilderness Areas Act. At hearings, Senator Church emphasized the threat the purity misinterpretation posed to the vision of a single nationwide system of wilderness areas, telling the Forest Service: "If we [adopt your interpretation] we will be saying, in effect, that you can't include a comparable area in the West in the wilderness system. That is the precise effect of your approach, because you will have redefined section 2(c) of the Wilderness Act" (Church 1973b, p. 31).

The framers of the Wilderness Act designed a practical law applicable to the realities of land use history.

In the Eastern Wilderness Areas Act (Public Law 93-622) signed by President Gerald Ford on January 3, 1975, Congress designated 16 new wilderness areas totaling 206,988 acres (83,800 hectares) of national forests lands east of the Rockies. The final legislation adopted some elements of the Forest Service–inspired bill, but did not alter the definition and intent of the Wilderness Act. Congress had flatly repudiated the most serious threat to the vision of a nationwide wilderness system.

Understanding the legislative history of the Wilderness Act and the Eastern Wilderness Areas Act helps reinforce seven important lessons:

1. **The National Wilderness Preservation System is just that—*national*.** Wilderness areas east and west are subject to the same criteria and stewardship mandate. The Forest Service now administers 121 wilderness areas comprising some 1,950,000 acres (789,473 hectares) east of the Rockies. Widened to all agencies, there are 166 wilderness areas comprising 4,245,000 acres (1.7 million hectares) in that region, including most recently the Gaylord Nelson Wilderness in Apostle Islands National Lakeshore (Wisconsin) signed by President George W. Bush in December 2004.

2. **Our National Wilderness Preservation System is wildly diverse.** The wilderness system, still a work in progress, already fulfills Aldo Leopold's vision that in any practical wilderness program, the areas will be diverse in both size and degree of wildness. Of the smaller areas nearer population centers, Leopold, Bob Marshall, and the other founders of The Wilderness Society observed that "although one cannot obtain in them the adventure, the dependence on competence [for survival], and the emotional thrill of the extensive wilderness, they are the closest approximation to wilderness conditions available to millions of people" (The Wilderness Society 1935, p. 2).

3. **There is no "eastern wilderness act."** The law signed January 3, 1975, has no short title, which would usually be found in section one. In fact, this law has no section one, reflecting a clerical error back when "cut-and-paste" meant just that. Dropped on the cutting room floor was the short title "Eastern Wilderness Areas Act," the title of the Senate-passed bill and the version approved by the House committee. The word *Areas* in this title signals that this was simply one more law designating additional areas within the one-system structure of the Wilderness Act. Had the title been "Eastern Wilderness Act," some might argue it implied a separate legal regime for wilderness areas in the East.

4. **Congress, not the agencies, decides what lands are suitable as wilderness.** Federal agencies provide recommendations on proposed wilderness legislation. But executive branch recommendations are not definitive; recommendations also come from other interested parties. As exemplified by the Eastern Wilderness Areas Act, Congress acts as a "court of appeals" to which citizens may appeal when they feel an agency's political leadership is misinterpreting the act or taking an unsatisfactory position on the dimensions of a proposed area.

5. **Purity: "A misperception exists—let's get rid of it."** The purity theory is demonstrably at odds with the congressional intent of the Wilderness Act. Congress has designated many wilderness areas with a history of human impacts, whether over an entire area (as is true of the Gaylord Nelson Wilderness designated in 2004) or in a portion, as is typical in lower elevation valleys or plateaus in the West where some evidence of earlier human impact can almost

Figure 5—Shenandoah Wilderness in Virginia (National Park Service). Photo courtesy of National Park Service.

invariably be found. Nonetheless, the purity theory is raised periodically by agency personnel, interest groups, or members of Congress who do not know this history or are unsympathetic to new wilderness designations. I like the advice one Forest Service official offered at an agency workshop in 1983: "Understand that there is one, and only one, National Wilderness Preservation System as established by Congress. The Wilderness System is dynamic and diversified throughout our Nation. … A misperception exists—let's get rid of it" (Joy 1983, p. 6).

6. **Restoration is an important issue for wilderness managers.** Given the fact that no wilderness area is or could be utterly "pure," administrators are presented with challenges concerning possible active steps to restore what some perceive to be more "natural" ecosystem function. My own view is that east or west, great hesitation is needed in decisions to actively manipulate a wilderness environment in the name of restoring what we might perceive as more natural ecosystem function. A fundamental underpinning of wilderness philosophy and the Wilderness Act is that in these areas we meet nature on its terms, with humility—including the humble awareness that ecological "certainties" we perceive today may prove wrong with greater knowledge in the future. As Howard Zahniser put it, in wilderness we should be "guardians, not gardeners" (Zahniser 1963, p. 2).

7. **Congress has worked to get wilderness closer to urban populations.** Congress has made a particular effort to protect wilderness areas near where people live, beginning with the1968 designation of the San Gabriel Wilderness adjacent to Pasadena, California. Today the system includes the Sandia Mountain Wilderness and the Pusch Ridge Wilderness, literally on the city limits of Albuquerque and Tucson, respectively. For the same reason, where the opportunities for protecting wilderness areas are so constrained, as in the eastern half of the country where federal lands are so rare, Congress has shown a consistent strong interest in securing near-the-people wilderness areas.

> The purity theory is demonstrably at odds with the congressional intent of the Wilderness Act.

Conclusion

The rich legislative history documented by the framers and champions of the Wilderness Act is reinforced in the legislative history of more than 120 laws adding new lands to the wilderness system. This history consistently demonstrates that in its broad purpose and fine details, this is a practical law thoughtfully shaped by practical people. As in the eastern wilderness debate, we have an obligation to sustain their practical vision and not wander into misinterpretations that would hamstring the building of the National Wilderness Preservation System.

In statutory language in the Vermont Wilderness Act of 1984, Congress chose to remind us of its long, consistent application of the fundamental features of the Wilderness Act. It is a concise statement not limited to Vermont or the East—a statement every agency wilderness steward and every wilderness advocate should keep readily at hand:

> The Wilderness Act establishes that an area is qualified and suitable for designation as wilderness which (i) though man's works may have been present in the past, has been or may be so restored by natural influences as to generally appear to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable, and (ii) may, upon designation as wilderness, contain certain preexisting, nonconforming uses, improvements, structures, or installations, and Congress has reaffirmed these established policies in the designation of additional areas since enactment of the Wilderness Act, exercising its sole authority to determine the suitability of such areas for designation as wilderness." (Public Law 98–322, Section 101[a][5]) **IJW**

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Figure 6—Ellicott Rock Wilderness in North Carolina and South Carolina (USDA Forest Service). Photo courtesy of USDA Forest Service.

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From ALDO LEOPOLD on page 30

this research, Leopold Institute scientists developed a simple monitoring tool to measure and monitor change in trust levels among participants in the forest's collaborative planning process for fuels treatment. Scientists, managers, and the public are actively collaborating to incorporate results from these research efforts into management decisions.

The use of management-ignited prescribed fire in wilderness in the Northern Rockies offers another excellent opportunity for Leopold Institute scientists to better understand social and institutional influences on wilderness fire stewardship. Scientists have assessed public support for prescribed fire in wilderness with a survey of visitors to the Bob Marshall Wilderness Complex. In addition, a 10,000-acre (4,016 ha) prescribed burn in the Scapegoat Wilderness is serving as a case study for a focused assessment of public response to prescribed fire by members of the public residing in wilderness-proximate communities.

Scientists at the Leopold Institute seek to be responsive to national initiatives on fire and fuels management (e.g., the National Fire Plan and the Healthy Forests Initiative) by providing land managers with the information needed to restore and maintain natural fire regimes in wilderness while protecting both local and national values across the landscape. This type of research will be critical in the future for understanding trade-offs made by decision makers at the interface between wilderness and nonwilderness lands. **IJW**

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Keeping the Wild in Wilderness

Minimizing Nonconforming Uses in the National Wilderness Preservation System

BY GEORGE NICKAS and KEVIN PROESCHOLDT

Introduction

Forty years after passage of the 1964 Wilderness Act, it is increasingly clear that, despite the best intentions of the law, many lands within the National Wilderness Preservation System (NWPS) are degrading. One of the greatest emerging challenges to protecting the wild character of these lands is the preponderance of *special provisions* or *nonconforming uses* that have been included in subsequent wilderness bills. These provisions not only allow activities within wilderness that are inappropriate and degrade individual areas, but more importantly the cumulative impact of these special provisions threatens to diminish the core values that distinguish wilderness from other public lands.

l to r: Co-authors George Nickas and Kevin Proescholdt.

Overview: Wilderness Has Its Own Meaning and Worth

To understand the manner in which wilderness conditions are being eroded and wilderness character degraded, we must first understand what wilderness is, what wilderness character means and symbolizes, and then we can determine what standards are necessary for protecting wilderness as a unique resource.

1. **Wilderness—legal definition.** The statutory definition for wilderness in the United States is found in Section 2(c) of the Wilderness Act. The framers of the act intended that the first sentence of this section would establish the meaning of wilderness: In testimony before the final Senate hearing on the wilderness bill in 1963, the bill's chief author, Howard Zahniser, testified that "the first sentence defines the character of wilderness…In this definition the first sentence is definitive of the meaning of the concept of wilderness, its essence, its essential nature—a definition that makes plain the character of lands with which the bill deals, the ideal."

> A wilderness, *in contrast* with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are *untrammeled* by man, where man himself is a visitor who does not remain [emphases added]. (1964 Wilderness Act, Sec. 2[c]).

By law, wilderness is to remain *in contrast* to modern civilization, its technologies, conventions, and contrivances. This intent is underscored in Section 4(c) of the act, expressly prohibiting commercial enterprises and permanent roads. With only very narrow exceptions it prohibits temporary roads, motor vehicles, motorized equipment, motorboats, aircraft landings, mechanical transport, structures, or installations in wilderness. These incompatible activities are prohibited because allowing their intrusion blurs the distinction between wilderness and modern civilization, diminishing wilderness character and the unique values that set it apart.

Figure 1—Jetboat on the Main Salmon River, Frank Church-River of No Return Wilderness. Motorboat use has increased dramatically since Wilderness designation. Photo courtesy of Wilderness Watch.

Figure 2—Water truck filling desert bighorn sheep guzzler in the North Maricopa Mountain Wilderness. Photo courtesy of Bureau of Land Management.

Figure 3—Guzzler under construction in the North Maricopa Mountains Wilderness. Photo courtesy of Bureau of Land Management.

Congress also specified that wilderness would be *untrammeled*, meaning free of the human intent to manipulate, alter, control, or subjugate nature. In wilderness, the forces of nature would be allowed to shape the landscape and the interplay of plants and animals without intentional human interference. In this definition, Congress defined the core qualities of wilderness. It also provided statutory direction for how humans will interact with wilderness, what our relationship will be with these special places. In wilderness, Congress clearly intended that human activities and technologies will not dominate or develop the landscape, and will not manipulate natural processes.

2. **Wilderness Character—what the law seeks to preserve.** The overarching statutory mandate in the Wilderness Act is to preserve the wilderness character of each wilderness within the NWPS. Numerous courts have found that preserving wilderness character is the purpose of the Wilderness Act. See, for example, *Wilderness Watch v. Mainella* (2004, 11th Circuit Court of Appeals) and *High Sierra Hikers Assn. v. Blackwell* (2004, 9th Circuit Court of Appeals). This principal tenet of the law is described in Section 4(b):

> Each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. (1964 Wilderness Act, Sec. 4[b])

Preserving wilderness character includes protecting the natural and scenic qualities of the landscape, natural soundscapes, and the free play of ecological and evolutionary processes. Wilderness character also includes the absence of those things that diminish it, such as human-built structures, roads, bridges, campsites, highly developed trails, motor vehicles, mechanized equipment, crowding, mining, and livestock grazing.

Like personal character, wilderness character involves intangible qualities as well. These components include outstanding opportunities for solitude and primitive and unconfined recreation, and the associated experience of freedom, self-reliance, risk, adventure, discovery, and mystery. Wilderness is a place set apart—both physically and psychologically—from modern civilization and its commercial and material distractions.

Perhaps the best attempt to define and embrace all these aspects of wilderness character came in the U.S. Fish and Wildlife Service's 2001 Draft Wilderness Stewardship Policy. This policy stated in part:

> Preserving wilderness character requires that we maintain the wilderness condition: the natural, scenic condition of the land, biological diversity, biological integrity, environmental health, and ecological and evolutionary processes. But the character of wilderness embodies more than a physical condition. … The character of wilderness refocuses our perception of nature and our relationship to it. It embodies an attitude of humility and restraint that lifts our connection to a landscape from the utilitarian, commodity orientation that often dominates our relationship with nature to the symbolic realm serving other human needs. We preserve wilderness character by our compliance with wilderness legislation and regulation, but also by imposing limits upon ourselves." (2001, p. 3714)

How Nonconforming Uses Are Degrading Wilderness

The unique values that characterize lands within the National Wilderness Preservation System are being steadily degraded. The reasons can be broadly categorized as (1) increased motorized use, (2) commercialization, (3) manipulation of natural processes, and (4) changing types and levels of recreational use.

Special provisions in new wilderness bills exacerbate these problems and are becoming paramount in the overall threats to wilderness nationwide.

Nonconforming Uses Diminish Wilderness Character

Nonconforming uses diminish an area's wilderness character and the opportunity for present and future generations to experience the unique benefits of authentic wilderness. Section 4(d) of the Wilderness Act is titled "Special Provisions." These so-called nonconforming uses are compromises that diminish wilderness character, but were nonetheless written into the original law. These special exceptions are qualified to various degrees so as to provide federal wilderness managers with the ability to regulate these uses to minimize their impacts on wilderness.

With the exception of honoring private existing rights and for fire management, the Wilderness Act requires that the other activities be administered to protect wilderness character. For instance, the exception for commercial services allows for commercial outfitting and guiding only to the extent the services are both *necessary* and *proper* for realizing wilderness benefits and done in a manner that protects the wilderness character of the areas. In other words, whereas the Wilderness Act allowed for some nonconforming activities, the law also provided managers with the tools they needed to ensure that the impacts from these exceptions would be rare and carefully controlled. Unfortunately, the good intentions of the law are not always being realized on the ground.

The responsibility for regulating the uses allowed by special provisions falls to federal agencies that have often *not* been supportive of good wilderness stewardship. All four agencies are falling woefully short in meeting their stewardship responsibilities (see, e.g., Pinchot Institute for Conservation 2001). Given the lack of commitment to or understanding of good stewardship on the part of some managers, exceptions in wilderness bills often result in far more damage to wilderness character than the writers and supporters of these exceptions anticipated.

The Central Idaho Wilderness Act (CIWA), which designated the River of No Return Wilderness (later named the Frank Church-River of No Return Wilderness), is a case in point. When that law was passed in 1980 there were eight airplane landing strips in the wilderness in public use on national forest land. Under the Wilderness Act, the Forest Service had the authority to close any or all of the landing strips and was moving in that direction on at least two. A special provision in CIWA prohibited the Forest Service from closing any landing strip "in regular use on national forest lands" at the time of designation without the express approval of the state of Idaho. This provision effectively precluded closing any of the existing strips and in fact has resulted in far worse conditions. Under pressure from pilots and the state, the Forest Service recently recognized four more meadows as additional historic landing strips, increasing the total number to 12. Furthermore, the landing of airplanes in the wilderness has exploded to more than 5,500 each year, much of it for practicing touch-and-go landings and for "bagging" airstrips—activities that have nothing to do with accessing the area for wilderness purposes.

Another special provision in CIWA prohibited the Forest Service from reducing motorboat use on the main Salmon River to a level below that which occurred in 1978. Forest Service reports prepared at the time indicate there was a relatively small number of jetboats using the main Salmon River. The upper 40 miles (64.5 kilometers) of designated Wild River received less than one jetboat trip per day in 1978. Today, the Forest Service permits 18 commercial companies unlimited trips for hauling rafters, hunters, anglers, and sightseers up and down the entire length of the 85-mile-long (137-kilometer-long) Salmon River. In 2003 the agency also tripled (to 40 boat-days per week) the amount of private jetboat use allowed during the summer season. There are no limits on off-season trips. In short, special provisions in the CIWA have allowed the largest contiguous wilderness in the lower 48 states, an area that should provide the ultimate wilderness experience, to instead be riddled with landing strips and unlimited airplane and jetboat use. It is also important to note that much of the motorized use occurs in order to facilitate commercial services (outfitting and guiding), a Wilderness Act exception that itself is limited to the degree that the activity is both *necessary* and *proper* in a wilderness context.

Figure 4—Cowboy camp in the Emigrant Wilderness; the so-called Congressional Grazing Guidelines allow for supporting activities including fences, line cabins as part of livestock grazing operations in Wilderness. Photo by George Nickas.

One of the most widespread examples of the unanticipated consequences of special provisions is the Congressional Grazing Guidelines (CGG) that Congress first included in a Colorado national forest wilderness bill in 1980. The Guidelines have been

Figure 5—Airplanes and outfitter camp in the Arctic Wildlife Refuge Wilderness. Some commercial outfitters take advantage of provisions in the Alaska wilderness bill to conduct aircraft-intensive hunting operations. Photo courtesy of US Fish and Wildlife Service.

included in most national forest and Bureau of Land Management (BLM) wilderness bills since that time. Livestock grazing was "grandfathered" into the 1964 Wilderness Act, which provided that, subject to reasonable regulation, livestock grazing shall be allowed to continue in those areas where it was an established use. The 1980 grazing guidelines opened the door to a variety of more abusive uses. The guidelines authorized ranchers to use motor vehicles and equipment and to develop new "improvements" for certain livestock management activities provided there were no "practical alternatives" and where such activities cannot "reasonably and practically be accomplished on horseback or foot." The CGG have been incorporated in the *Forest Service Manual* at FSM 2323.22 and can be viewed at www.fs.fed.us/im/directives/fsm/2300/2320.1-2323.26b.txt.

Most wilderness advocates at the time felt the impact of the guidelines would be minor and result in motor vehicle incursions only under the most rare of circumstances. Most wilderness areas designated prior to 1980 had little or no domestic livestock grazing within their borders. In those wildernesses with substantial livestock grazing, the use of motor vehicles as part of those grazing operations was rare or nonexistent. To many, the impact of the CGG seemed very minor at the time. In the late 1990s, as part of an appeal challenging a U.S. Forest Service decision allowing motorized access to a line shack on the Mazourka Allotment in the Inyo Mountains Wilderness in California, neither Wilderness Watch nor the Forest Service was able to identify a single instance where the Forest Service had permitted motorized access in a Wilderness for grazing purposes.

That situation is changing because many of the wildernesses added to the system in the past two decades, particularly those in the Intermountain West and the desert Southwest, are extensively grazed by cattle or sheep. Ranchers have become increasingly accustomed to using off-road vehicles in these areas. The BLM in particular, which now administers about one-quarter of all wildernesses, has proven woefully lenient in allowing ranchers to drive off-road vehicles in wilderness. For example, in administering the Steens Mountain Wilderness in eastern Oregon, the BLM allows ranchers unrestricted use of motor vehicles for tending their cattle. The Congressional Grazing Guidelines are *more* restrictive than the BLM's implementation of them on Steens Mountain. However, environmentalists have been unsuccessful in trying to prevent unlimited driving, whereas local congresspeople have consistently pressured the BLM to interpret the Guidelines in the most lenient fashion. The BLM relies on ambiguous language in the Steens Act to justify its actions.

Further damage to wilderness can be traced to the guidelines. In 2002 a federal court, relying on the grazing guidelines, ruled that the Department of Agriculture was justified in killing a large number of mountain lions in the Santa Teresa Wilderness in Arizona in order to protect domestic livestock (*Forest Guardians v. Animal & Plant Health Inspection Serv.,* 2002, No. 01-15239, U.S. Court of Appeals for the Ninth Circuit, 309 F.3d 1141).

These examples represent just a few of the threats presented by special provisions in wilderness bills, and they also highlight the unintended consequences that arise from making such exceptions. Most managers have been unable or unwilling to regulate or limit these nonconforming uses. Thus even when discretionary safeguards have been included in legislation, they have proven ineffective for protecting wilderness character from the harm that results from special provisions.

This array of nonconforming uses decreases the recognizable core qualities that define wilderness across the system. It brings about a gradual decline in the overall wilderness standards that govern the NWPS. Some nonconforming uses in wilderness may seem small, or of little impact in a National Wilderness Preservation System that encompasses more than 660 areas and 106 million acres (42.9 million hectares). But each nonconforming use violates the ideal and integrity of wilderness and diminishes the wilderness character and symbolic value of all wilderness areas in the system. The cumulative impact of hundreds of nonconforming uses is significant.

Precedence in Nonconforming Uses

Nonconforming uses allowed in one wilderness bill are replicated—and often expanded—in subsequent wilderness bills. Once an exception is made in one bill, it becomes harder to exclude similar exceptions in future wilderness bills. Whereas some may argue that there are no binding precedents, that each bill is a unique situation, history argues otherwise.

Three noteworthy examples of provisions that have become troublesome precedents for other bills include (1) the Congressional Grazing Guidelines discussed above, (2) motorized access for state fish and game departments, and (3) access to private land inholdings (nonfederal lands) within wilderness.

Special language allowing for vehicle use for wildlife management first appeared in the 1984 Wyoming Wilderness Act. The exception was very narrow and for a specific purpose: allowing motorized access to a specific location in the Fitzpatrick Wilderness for capturing bighorn sheep. The provision applied only to a 6,000-acre (2,409-hectare) addition to the Fitzpatrick Wilderness in order to allow occasional motorized access for capturing and transporting bighorn sheep. The trapping program had been conducted for many years to transplant bighorns from the Wind River Mountains to other mountain ranges throughout the West where Rocky Mountain bighorns had been extirpated.

Six years later, Congress greatly expanded motorized access and other wilderness-damaging activities under the guise of wildlife management in 39 new wildernesses designated in the Arizona Desert Wilderness Act. The Arizona Desert Wilderness Act of 1990 referred to a memorandum of understanding (MOU) between the BLM, the Forest Service, and the International Association of Fish and Wildlife Agencies as guidance for the types of activities that should be allowed in wilderness. The MOU allows for predator control, constructing artificial water sources, poisoning streams, stocking nonnative fishes, and, in many cases, the use of motor vehicles and motorized equipment in carrying out these activities. Although the federal land managers retain authority to regulate or limit any activity under the MOU, they are often unable or unwilling to do so. MOUs are not legally enforceable unless they are incorporated into statutes, as is the case in a growing number of wilderness bills.

There are now permanent roads in some wildernesses used for constructing, operating, and maintaining artificial water developments, called "guzzlers," which are designed to artificially inflate the numbers of bighorn sheep and other game species. In various forms, this exception for motorized uses for fish and wildlife management has been continued in several subsequent wilderness designations, including the Los Padres Condor Range and River Protection Act (1992), the California Desert Protection Act of 1994, the Clark County Conservation of Public Land and Natural Resources Act of 2002, and the Lincoln County Conservation, Recreation, and Development Act of 2004.

Figure 6—Non-conforming uses of motorboats and truck portages degrade the wilderness character of the Boundary Waters Canoe Area Wilderness in Minnesota. Photo by Kevin Proescholdt.

Access to inholdings that are surrounded by wilderness provides a third example of how precedents are unexpectedly set when damaging provisions are included in a wilderness bill. The framers of the Wilderness Act anticipated the potential conflict between wilderness protection and the desires of private landowners wanting access to their inheld lands. In those cases where the desired access is incompatible with wilderness protection, the 1964 act offers the inholder "adequate access" or an "exchange for federally owned land in the same state of approximately equal value" (Section 5[a]). An opinion from the U.S. attorney general in 1980 concluded that wilderness managers retained the right to deny access that would be harmful to wilderness and could offer an exchange instead:

> The language of 5(a) indicates that a landowner has a right to access or exchange. If he is offered either, he has been accorded all the rights granted by the statute. If you offer land exchange, the landowner has no right of access under 5(a). (43 Op. Attorney Gen. 243, 269, 1980)

It was an excellent solution to a problem with dangerous potential to degrade wilderness. Within the 106-million-acre (42.9-million-hectare) NWPS, there are well over one-half million acres (202,345 hectares) of inholdings in thousands of widely scattered individual parcels. By giving land managers the authority to offer an exchange rather than allow harmful access, the act assured that the right decision for wilderness could be made every time. Yet, here again, special provisions in new bills have begun to erode the protections ensured by the Wilderness Act.

A provision inserted into the Alaska National Interest Lands Conservation Act (ANILCA) in 1980 dealt the first blow to the protections afforded in Section 5(a). That provision states that the secretary of agriculture "shall provide such access to nonfederally owned land within … the National Forest System … adequate to secure the reasonable use and enjoyment thereof." Whereas every other provision in ANILCA applies only

to Alaska, the reference to "National Forest System" led the Forest Service to conclude that the provision applies to all national forest lands, including wilderness, in the lower 48 states. The U.S. Department of Agriculture has codified this interpretation in its regulations applying to all national forest wildernesses. For its part, the BLM has also applied the access language of ANILCA to all lands under its jurisdiction. Whether or not the agencies have correctly interpreted this special provision in ANILCA, it has severely hampered the ability to protect wilderness by offering a land exchange in lieu of allowing potentially harmful access. It is important to note, however, that the courts have not yet ruled on the question of whether this section (1323[a]) of ANILCA effectively amended the Wilderness Act.

As with other special provisions, the "access" exception in ANILCA is being repeated in subsequent bills. In 1994 the California Desert Protection Act (CDPA) included access language nearly identical to ANILCA, thereby ensuring that this weakening provision would apply to the 69 areas and millions of acres of wilderness designated by the CDPA. Subsequent laws designating Wilderness in Oregon and Nevada have included variations of the language used in the CDPA.

As a result of access provisions included in the above-mentioned laws, the BLM and Forest Service have begun approving motorized access (and related road development and improvements) to inholdings for a variety of inappropriate uses in wilderness. These include weekend camping and stargazing (Palen-McCoy Wilderness, CA), building and operating a horse breeding and dude ranch (Mt. Tipton Wilderness, AZ), campground development (Kalmiopsis Wilderness, OR), and commercial outfitting and guiding (Steens Mountain Wilderness, OR).

Protecting Wilderness Character in Legislation

It is imperative that wilderness advocates oppose the use of special provisions in new wilderness bills. Forty years of experience in implementing the Wilderness Act have shown that the special provisions in various wilderness bills are leading to serious degradation to both the Wilderness *ideal* and to the Wilderness condition.

- **Avoid nonconforming uses in new wilderness designations.** Wilderness advocates should keep proposals for designating new wildernesses clean of nonconforming uses, while working to remove such provisions from bills introduced in Congress.
- **Keep wilderness bills brief and free of special management language, even if the intent of the language is simply to reiterate the provisions of the Wilderness Act.** The simplest and most straightforward way to address this problem is to eschew special language and instead include a statement saying the area is to be managed in accordance with the Wilderness Act.
- **Minimize the impacts of any new nonconforming uses in wilderness legislation.** Phase out the nonconforming uses over time. Congress included motorboat phaseouts for specific lakes in the 1978 Boundary Waters Canoe Area Wilderness Act. Limit the impacts from nonconforming uses allowed in the Wilderness Act that might not be phased out over time. Examples of such use include livestock grazing and some commercial services. Place the nonconforming uses outside of the wilderness boundary if possible.
- **Consider alternative designations if special provisions that compromise the ability to manage the area *as wilderness* can't be avoided and if protection is needed for an area from other uses such as logging or ATVs.** In the 60,000-acre (24,096-hectare) Rattlesnake area that borders Missoula, Montana, Congress designated the lower half of the area, which is popular for day hiking, mountain biking, and horseback riding, as the Rattlesnake National Recreation Area and the more remote upper half as the Rattlesnake Wilderness.

Conclusion

Wilderness advocates must ensure that special provisions in new wilderness bills and incompatible uses in existing wildernesses are not allowed to further degrade the wilderness character of NWPS units. We must seize opportunities to stem the erosion of wilderness standards and the gradual degradation of the system that is occurring due to special provisions in wilderness legislation. By taking an aggressive stance against new nonconforming uses we can ensure that we pass on to future generations the "enduring resource of wilderness" that the framers of the Wilderness Act sought to preserve and that future generations deserve to inherit. **IJW**

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Developing Wilderness Indicators on the White Mountain National Forest

BY DAVE NEELY

Introduction

Wilderness stewards across the United States face a wide array of challenges in meeting the mandates of the Wilderness Act. The seemingly contradictory requirements to manage an area for use and keep it untrammeled, ensure solitude, and provide for primitive and unconfined recreation; protect and manage for natural conditions, and keep the imprint of humans' work substantially unnoticeable are a tall order to meet regardless of location. In the eastern United States, with its dense urban and suburban population, a long history of agricultural and industrial development, relatively small parcels of public lands—and even smaller parcels of wilderness—make these challenges increasingly difficult. Providing an enduring resource of wilderness in the face of a growing, developing population and high or increasing recreation use sets the stage for difficult management decisions. Even the tools to manage people and their impacts on wilderness have effects themselves. In this context, each management action becomes a trade-off of sorts, compromising one value for the other toward the lofty goal of maintaining wilderness character.

The Limits of Acceptable Change (LAC) planning approach has served managers well through the years by systematically clarifying the acceptable point of compromise between legitimate and sometimes conflicting uses of wilderness. We can clearly describe to the public just how much impact, or change, we can tolerate by identifying measurable indicators and the standards that serve as thresholds, and management actions needed when those standards are exceeded. For LAC to work, good indicators must be selected that are clearly observable, measurable—often by seasonal employees rather than trained researchers—and defensible as representative of overall change in wilderness conditions.

Article author Dave Neely

To help get a handle on the wide range of possible selections, potential indicators have been traditionally grouped into two categories characterized as biological or biophysical and social. Initially this division seems to make sense, allowing us to think on one hand of impacts on the land resulting from human use and on the other hand of experiential impacts caused by interactions with people. However, this grouping neglects the true complexity of interactions between people and their internal and external environments. In addition, restrictive management actions tied to either purely biophysical impacts or purely social can be problematic. Our publics have often shown an unwillingness to accept limits on recreational use of wilderness based on social indicators alone. At the same time, it can be extraordinarily difficult to make the case that significant effects on the overall health of a wilderness ecosystem result primarily from recreation impacts and, therefore, require limits on recreation use.

After wrestling with the limitations of these groupings, the Wilderness Planning Group on the White Mountain National Forest (WMNF) began thinking about types of indicators in slightly different ways for a modified LAC process we used to shape the wilderness management portion of our revised WMNF Land and Resources Management Plan. This process helped us come to terms with which indicators to emphasize in the WMNF plan document.

Figure 1—The Great Gulf Wilderness on a clear day. Photo by Rob Esty, USFS.

Figure 2—Fire damage in the Sandwich Range Wilderness—before. Photo by Karen Clarey, USFS.

Figure 3—Fire damage in the Sandwich Range Wilderness—after. Photo by Karen Clarey, USFS.

LAC Indicator Selection

We asked ourselves a basic question with each indicator: What is our primary concern? Or, in other words, why are we concerned with monitoring this impact? We discovered that we ended up with three basic answers, and these provided the basis for our categories: (1) concern for the overall health of the ecosystem; (2) concern for the social experience of an area; and (3) concern for the condition of the local landscape and the quality of the social experience dependent on the condition of the landscape (see figure 1). This led us to develop our three indicator categories: biophysical indicators, social indicators, and aesthetic indicators.

For the WMNF plan, biophysical indicators include measures of human impact on the land in terms of the overall biological health and quality of the large-scale environment—our effects on the ecosystem as a whole. Many of these impacts arise from actions and events that occur outside of wilderness; for example, our local air quality concerns stem largely from automobile and industrial emissions, and high or increasing pH levels in wilderness streams are most influenced by acidic precipitation rather than local point-source pollution. These indicators were considered distinct from others because the primary concern is for the health and quality of ecosystems and ecosystem components—watersheds, airsheds, wildlife and vegetative populations—rather than for the quality of the human experience based on those components. While recognizing that an unhealthy ecosystem has an effect on the human wilderness experience, we should be concerned with polluted water, or acid rain, or endangered species for many reasons above and beyond the effect on human recreation experience in a particular wilderness.

Our social indicators include human-to-human impacts, but only impacts resulting from immediate contact, such as meeting multiple parties throughout the day along a trail, encountering a large, loud group at a mountain summit, or an encounter with a backcountry ranger. These indicators are categorized as distinct from others because they are strictly a measure of how people directly affect other people, and the primary concern is for the human experience in terms of type, quality, and frequency of interaction with others.

Aesthetic indicators measure human impacts on the land, but—unlike the broad-scale biophysical category—are measures of how direct human impacts on the immediate landscape affect the human experience of the wilderness. These impacts are usually local in scope, constrained to an immediate area, and result primarily from recreation use. As something of a combination of the first two groups, they measure a social impact to a biophysical resource and are concerned with the resulting experience of that impacted resource. Those common recreation impacts managers face on a day-to-day basis—trash in a campsite, proliferation of campsites around a pond, a boulder charred by campfires (see figure 2 and 3), or graffiti carved into a tree—fall into this category. With these indicators the primary concern is for the human experience as it derives from the health and quality of the immediate, local landscape. This distinction is made, in part, based on a belief that whereas excessive soil compaction due to heavy campsite use or proliferation of campsites around a pond are indeed problematic, these impacts are unlikely to have an effect on the overall health and productivity of the soil or the quality of water across the wilderness ecosystem. Even the oft-cited problem of human waste disposal seems unlikely to affect water quality generally within a watershed and is not on the scale of regionwide

acid rain deposition. With these types of recreation impacts, the concern seems to be very local and immediate in nature, and perhaps the greatest effect is on the experience of subsequent wilderness users (see figure 4). As such, the driving management rationale to mitigate them stems from the human experience.

From a practical, management perspective these groupings have several benefits. Generally, the large-scale concerns covered in the biophysical category have solutions outside the scope of federal wilderness managers' authority (e.g., enforcement of the Clean Air Act, increased fuel efficiency standards in vehicles, operation of coal-fired power plants) (see figure 5). Direct management of human-to-human social interactions can be ineffective, have little public support, may need to be heavily bureaucratic to have any measurable effect, and may be inconsistent with the unconfined aspect of the wilderness experience. The aesthetic indicators were believed to be more definable, be measurable by field staff, and include obvious impacts that the public generally supports mitigating. The tools to address these issues—the management actions triggered by exceeding the standards—were viewed by the planning team as reasonable, effective, and usually quite consistent with wilderness values.

With these observations as our starting point, we were able to select indicators that we felt served the LAC process for our small, heavily used eastern wildernesses. Biophysical indicators are actually covered in the overall monitoring section of our WMNF Forest Plan, and include air quality; water quality; presence of threatened, endangered and sensitive species; and presence of nonnative invasive species. Social indicators selected were (a) trail use levels, (b) destination use levels, and (c) visitor perception of crowding and quality of experience. Aesthetic indicators selected were (a) campsite density, (b) campsite size, and (c) presence of litter and human waste.

Conclusion

This process of indicator categorization helped us clarify our efforts in the LAC approach of defining standards and management actions. We also recognized that each category seemed to tie directly to language from the Wilderness Act, and this served as a means to confirm that we were indeed monitoring important aspects of wilderness character. Our selection of biophysical indicators relates to language in the Wilderness Act about providing an area that retained its "primeval character and influence" and was "protected and managed so as to preserve its natural condition and which…generally appears to have been affected primarily by the forces of nature" (Section 2). Our selection of social indicators relates to language in the Wilderness Act about ensuring "outstanding opportunities for solitude or … unconfined type of recreation" (Section 2). Our selection of aesthetic indicators relates to language in the Wilderness Act about maintaining areas "without permanent improvements … with the imprint of man's work substantially unnoticeable" (Section 2).

The five wildernesses on the White Mountain National Forest are within a one-day drive of nearly one-quarter of the population of the United States, and are within a four-hour drive of Montreal and Sherbrooke, Quebec. We believe that the LAC planning process and the sections of the Wilderness Management section of our draft WMNF Land and Resources Management Plan will ensure the continued opportunity to experience wilderness character within these small, heavily visited wildernesses for years to come. **IJW**

Figure 4—Campsite impacts, Sandwich Range Wilderness. Photo by Karen Clarey, USFS.

Figure 5—A clear day in the Presidential Range–Dry River Wilderness. Photo by Dave Neely, USFS.

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Understanding the Cultural, Existence, and Bequest Values of Wilderness

BY RUDY M. SCHUSTER, H. KEN CORDELL, and BRAD PHILLIPS

Article co-author Rudy M. Schuster

Introduction

A deeper understanding of public values regarding the National Wilderness Preservation System (NWPS) is of interest to researchers and managers. Wilderness values were defined in the National Survey on Recreation and the Environment (NSRE) (Cordell, Betz, and Green 2002; Cordell, Tarrant, and Green 2003a; Cordell, Tarrant, and Green 2003b) and it is conducted periodically by the U.S. Forest Service in part to track public attitudes toward the natural environment and public lands (Cordell et al. 2003a). The NSRE has provided a rich quantitative examination of wilderness value trends since 1995 using a module of wilderness value questions. Eighteen separate wilderness value questions have been developed and used. This article focuses on three values in particular: (1) cultural, (2) existence, and (3) bequest values.

Cultural value refers to the importance of wilderness as a source of symbols affecting human culture. The development of American heritage can be linked to wilderness and nature (e.g., Native Americans, pilgrims, pioneers, cowboys). An appreciation of national origins is important for an individual's sense of self-identity and is aided by wilderness symbols (Hammond 1985). Present-day culture is also evolving through wilderness. The phenomenon of wilderness activities reshaping culture is represented by the popularity of wilderness recreation. In addition, many basic cultural traditions shape our society and are of high value. A parent teaching a child to fish or how to make a campfire is a culturally rich experience. Wilderness is a means to pass cultural and family traditions between generations. Cultural value was measured in the NSRE by an individual's response to the following statement: Wilderness is important because nature and wildlands are important symbols of American culture.

Existence value is the satisfaction felt by an individual just knowing that wildlands exist (Cordell et al. 2003a). An individual may express existence value for the resource without having visited the wilderness in the past or have future intentions to visit. Originating from economic concepts, existence value was first described as the amount one would be willing to pay to preserve wilderness, regardless of visitation (Blomquist and Whitehead 1995). The current definition has been expanded to include an altruistic desire to preserve the wilderness for the good of humanity and the spiritual well-being that may result from wilderness existence. Finally, it was conceptualized that intrinsic meaning could be expressed as part of the existence value of a resource. Existence value was measured in the NSRE using the following statement: It is important just knowing that wilderness exists.

Bequest value encompasses elements of both cultural and existence values in that it is the value derived from being able to hand down natural resources to future generations so they can also experience wilderness values (Mountford and Kepler 1999; Rolston 1985). Bequest value was conceptual-

ized as having an element of stewardship or responsibility for the resource. Bequest value was measured in the NSRE by asking how important it was to the individual knowing that future generations will have wilderness areas.

Exploratory Study

In an attempt to better understand these three wilderness values, qualitative in-depth interviews (Rubin and Rubin 1995; Taylor and Bogdan 1998) were conducted to explore the original wording of the NSRE questions. Each participant was read the introduction to the wilderness module used on the NSRE and the value statements. Interviewees were asked to elaborate on what they understood the value to mean. Interviews were conducted in the spring of 2004 and ran approximately 30 to 60 minutes in length. Fifteen interviews were conducted. This exploratory research used a purposive sampling method through posting calls for participants on the Internet, in newsletters of volunteer organizations, and at local libraries. The current study attempted to pull a diverse sample that was not dependent on recreation participation.

Because the NSRE wilderness modules specifically address federal wilderness values, the respondents' understanding of context was examined. Each participant was read the following paragraph, similar to one from the NSRE survey, providing an overview of the NWPS:

> The purpose of this interview is to help us understand how American citizens value wilderness, and the benefits people receive from these areas. When we talk about wilderness we mean federal land that the Wilderness Act of 1964 allowed Congress to preserve as part of the NWPS. These lands cannot then be used for purposes such as timber harvesting, developing ski resorts, or building highways. To date, Congress has added over 660 wilderness areas to the NWPS to protect wildlife, scenery, water, and recreation opportunities, and to keep these areas wild and natural.

Although participants were instructed to answer the interview questions with the NWPS in mind, references to designated wilderness were rare. Frequent references to activities not allowed in federal wilderness areas, such as driving automobiles, suggested a lack of understanding of the NWPS. However, the results may still accurately measure wilderness values. Respondents may value all types of wilderness and other protected or otherwise undeveloped areas in the same ways.

When analyzing data concerning cultural, existence, and bequest values the following three themes emerged: preservation of wilderness, modern society's connection to wilderness, and off-site inspirational use of wilderness. Interviewees used these themes to provide context for how social values were realized from wilderness. Thus, the themes provide context for understanding the values and support their existence.

Preservation of Wilderness

Although participants were not explicitly asked questions regarding the amount of wilderness in the United States, all expressed opinions on the matter. The range of responses to this issue bore most directly on existence and bequest values. Some, such as Mike, a 51-year-old business consultant, lamenting a quickly diminishing wilderness resource, felt uncomfortable endorsing only an existence value.

> We have to work hard to keep existing wilderness areas and to add new wilderness areas. It's not enough to know that they're there.

Others, such as Ted, a 58-year-old attorney, while recognizing potential threats to the quality of wilderness, saw no urgency regarding the question of quantity.

> Notwithstanding my perception that human beings are just voracious animals that consume everything in sight like army ants, I still think that America's wilderness is simply so vast that I don't think that it's ever going to be expended. … In other words, I just don't see even America at its most aggressive ever really exhausting wilderness as a resource.

Responding negatively or positively to the amount of designated wilderness had an impact on how respondents viewed their responsibility toward future generations. Participants that sensed peril to wilderness resources were more likely to refer to intrinsic wilderness values and view their bequest as not just a gift, but also as a responsibility. For example, Derek, a 22-year-old student, expressed the following:

> It should be something that preserves it, as I preserved it for them. They should preserve it for their children.

On the other hand, Jennifer, a 39-year-old real estate agent, who remarked that wilderness is not in peril because nothing "terribly stupid is going to happen anytime soon," saw the bequest simply as an opportunity for future generations to enjoy the same recreational experiences as she has:

> My kids and grandkids should have the opportunity to see these things and not lose them forever. It's just a great experience that I would want to have continued.

When they felt that wilderness resources were threatened, respondents spoke of an ongoing, bequeathed responsibility, as well as the intrinsic worth of wilderness. When immediate

Respondents expressed that wilderness had intrinsic worth and directly linked the value of wilderness to society as a source of inspiration, means of understanding human relations to nature, and a cultural symbol.

threats were not perceived the respondents referred to enhanced recreational opportunities for their children and grandchildren. Both viewpoints stated that preserving wilderness for future generations was extremely important.

Modern Society's Connection to Wilderness

The concern that contemporary society has lost touch with wilderness surfaced in reference to all three values and was expressed in two different ways. Several respondents indicated that society is no longer connected to its biophysical roots. Jim, a 38-year-old minister, spoke of this severance from the natural world:

> I took my son down south [to wilderness] so he could see how things are. That everything ain't mainstream, nothing but cars. I think that's what our kids are missing. Missing that connection with nature itself… . It was the first time he'd ever seen a real horse. He said, "Dad, look at that big ol' dog!" "That ain't no dog, boy!"

Derek agreed:

> The whole frontiersman ideal was pivotal … and even in the early 20th century that sort of adventurous frontier spirit persisted. But recently, as we've moved away from wilderness, I think we've lost touch with what it really means. … I guess we don't really have a picture of what the wilderness is anymore because we're not in regular contact with it. We don't know how to deal with it as we did 100 or 200 years ago. I think the image has changed.

The loss of cultural significance was more important to the majority of respondents than the diminishing knowledge of the natural world. Concern for a societal disconnection to wilderness, coupled with the ability of each interviewee to name cultural symbols derived from wilderness, revealed the personal importance of wilderness as a source of cultural symbols.

Off-site Inspirational Use of Wilderness

The off-site use of wilderness as a source of inspiration was common to all of the respondents. Many used this idea to respond to the existence value statement. All respondents expressed that it is important to simply know that wilderness exists, whether or not they actually ever visit it. Several explanations were given. First, an intrinsic value of natural systems and organisms was recognized by some. Second, the off-site use of natural areas as sources of inspiration, visualization, or objects of meditation was important to many. Finally, the statement was often interpreted to encompass option value, as with Steve, a 34-year-old retail store manager:

> It's very important to know that it's there. It's great to know that that could be your outlet or your place to look forward to going to. It's a preserved option.

Using wilderness as a source of inspiration or an object of meditation was the value most often expressed in response to the existence value statement. As Ted stated:

> It provides an opportunity for inspiration that's rare enough. I mean, I'm guilty of being a couch potato, but I think it's a way to simply remind people that there's more to life than MTV and the Super Bowl.

Barbara explained that

> if you put your head in there [wilderness], you're more peaceful.

Derek even described the meditative experience he was having *during* the interview:

> For a second there I thought of being miles away from everything else and being at peace and all that other stuff we use nature for.

All 15 respondents referred to such off-site use at various points in the interview. Many interpreted the existence value statement by referring to such use. Regardless of whether this was applied to existence value or not, however, the majority of respondents reported a powerful off-site inspirational component of wilderness.

Cultural Value

When read the statement "Wilderness is important because nature and wildlands are important symbols of American culture," six participants' initial responses were negative or ambivalent. However, respondents readily provided symbols from nature and wildlands relating to American traits during the interviews. Initial negativity appeared to be based on the

perceived society–nature disconnect previously discussed. Respondents interpreted the cultural value statement as referring to the value that society as a whole places on wilderness, not their own personal valuation.

Existence Value

For nine of the 15 participants, existence value was interpreted as meaning that wilderness can provide spiritual or personal inspiration without having to visit the area. Because existence value encompasses a variety of off-site use values, the interpreted meaning comports with the researcher-intended meaning of existence value as the satisfaction one feels that a wilderness exists regardless of whether one visits the area. Respondents did not refer to other components of the theoretical underpinnings of existence value (intrinsic worth and altruism). This statement was interpreted as intended. However, respondents' interpretation was narrower in scope than the theoretical definition of the construct.

Bequest Value

Most participants spoke of bequest value as a gift carrying responsibility. Interviewees indicated that future development options should not be exercised and that future use should be consistent with current value systems. Thus, participants made it clear that the bequest of wilderness was of the holistic wilderness and not simply of undeveloped land for future use. The bequest of wilderness was seen as the bequest of cultural ideas to future generations by interviewees who expressed discontent concerning societal disconnect with nature. Although all respondents regarded ecosystem benefits of wilderness as important in other questions, such benefits were not referred in relation to the bequest question. The reason given by most participants to preserve wilderness for future generations was regarding recreational opportunities and the opportunity for spiritual inspiration.

Conclusion

The interview data indicated that the initial responses to the NSRE questions differed little from the intended meaning. Overall, the results of this project suggest that the wilderness value questions used on the NSRE are understood by the public and are valid indicators of the underlying constructs they were intended to represent. However, minor modifications may improve validity of the NSRE instrument. Future use of the cultural value question or similar questions should include modified wording to direct the respondent to consider personal values. Existence value was often interpreted as having a component of option value. In addition, the existence value statement was most often interpreted as relating to spiritual or meditative values, which were only one component of its multidimensional definition. Finally, recreation and other direct-use values were the most frequently cited reasons for preserving wilderness for future generations.

Respondents expressed that wilderness had intrinsic worth and directly linked the value of wilderness to society as a source of inspiration, means of understanding human relations to nature, and a cultural symbol. Respondents noted a concern that contemporary society has lost touch with wilderness. This disconnect resulted in the loss of an important cultural symbol and a diminishing knowledge of human biophysical roots. Respondents perceived the importance of preserving wilderness for future generations and that future generations had an ongoing, bequeathed responsibility to preserve it. This sentiment was best expressed by Jennifer: "My kids and grandkids should have the opportunity to see these things and not lose them forever." In general, the salience of wilderness value and respondents' perception of the current state of wilderness was best expressed through a quotation from Mike "We have to work hard to keep existing wilderness areas and to add new wilderness areas. It's not enough to know that they're there." **IJW**

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8th World Wilderness Congress Generates Conservation Results

BY VANCE G. MARTIN

Figure 1—A traditional opening to the 8th WWC, by Alaska natives. Photo by Carl Johnson.

The 8th World Wilderness Congress (WWC) met for almost two weeks in 2005 from late September to early October in Anchorage, Alaska, including several pre-Congress training sessions and seven days of plenary and concurrent sessions. The atmosphere was tangibly spirited and synergistic, and replete with enthusiastic, collaborative, and positive action. The Congress achieved its conservation objectives and generated additional results: new protected areas (private sector, native, and national); new wilderness legislation; increased governmental and organizational cooperation for new initiatives and networks; scores of professionals specifically trained in wilderness management, information and communications; new funding for targeted projects; and strong integration of conservation writers and photographers with scientists, managers, educators and policymakers.

The 8th WWC involved 1,200 delegates from 60 nations and emphasized the role of native peoples in protecting wilderness and wildlands. It tackled contentious issues such as the proposed oil and gas drilling in the Arctic National Wildlife Refuge and global warming. The following is a summary of the 8th WWC's major practical accomplishments, with more details available at www.8wwc.org or through info@wild.org.

New Wilderness and Protected Areas

- Cemex, one of the world's largest producers of cement, announced the designation of the El Carmen Wilderness Area, including critical biodiversity habitat owned by the corporation in northern Mexico. In cooperation with their partners, Sierra Madre, Conservation International, Birdlife, The WILD Foundation, and others, Cemex is creating a wilderness management plan for the Maderas del Carmen "Sky Island" and its stunning escarpment as part of a significant new protected area initiative called the El Carmen-Big Bend Conservation Corridor Initiative. This project will involve up to 10 million acres (4 million ha) (including private ranches, corporate land, and government land on both sides of the Mexico-U.S. border). Cemex has purchased more than 175,000 acres (70,280 ha) of new conservation land, creating key corridors, and has entered into agreements with adjoining private landowners for an additional 60,000 acres (24,095 ha) of new land under conservation management, including wilderness.

- The Bonobo Peace Forest Initiative in the Democratic Republic of Congo—a joint project of Vie Sauvage and the Bonobo Conservation Initiative (Washington, D.C.), includes conservation agreements with local communities and concessionaires covering more than 5 million acres (20,000 square kilometers) of habitat in one of the largest blocks of contiguous rain forest left on Earth, and home to

8th WORLD WILDERNESS CONGRESS
30 SEPTEMBER - 6 OCTOBER 2005 ANCHORAGE, ALASKA

the bonobo, the smallest of the endangered great apes. It includes core wilderness areas as well as community-managed forest reserves and sustainable development zones.

The Wild Planet Fund

New funding for a proactive global wildlands initiative was announced, with Cemex partnering with The WILD Foundation to launch the Wild Planet Fund, the funding mechanism for The Wild Planet Project. "We will explain and quantify the economic, biological, and social benefits of intact wilderness, and communicate this information to the public and to decision makers more effectively," said Cyril Kormos, vice president for policy for The WILD Foundation and head of The Wild Planet Project.

The project includes: compilation of the latest information on mapping wilderness in terrestrial, marine, and freshwater systems; reviewing management techniques for wilderness protected areas; and conducting a comprehensive assessment of how wilderness areas are designated via government protected areas, private sector designations, or indigenous conservation initiatives. The Global Environment Facility, associated with the World Bank, has also endorsed the initiative as important to the protection of biodiversity, especially in tropical countries and key desert habitats.

(*Note:* look for a special edition of *IJW* in August 2006, dedicated to The Wild Planet Project).

New Wilderness Legislation

Ernesto Enkerlin, (president of CONANP, National Commission for Protected Areas in Mexico) announced that wilderness will be a new official category of Mexico's protected area framework, with the capability of being applied on all types of land, including corporate, federal, communal, and other private lands. This is the first such legal use of the term *wilderness* as a protected area category in all of Latin America.

Freshwater and Marine Wilderness

Under The WILD Planet Project, a consortium of organizations, including Conservation International, The National Oceanic and Atmospheric Administration (NOAA), and others unveiled new and improved inventories and definitions to address the protection as "wilderness" of marine and freshwater systems around the world.

Figure 3—Attendees shared stories of their local wilderness areas. Photo by Carl Johnson.

Figure 2—Ian Player from South Africa delivers a passionate speech about wilderness. Photo by Carl Johnson.

Native Lands and Wilderness Council

Also part of The WILD Planet Project, indigenous people from 25 nations around the world formed the Native Lands and Wilderness Council and set initial goals for the group. This process—funded by the Christensen Fund, Ford Foundation, WILD, and others—passed a resolution to continue meeting and will produce a handbook to encourage and informing tribal communities around the world on managing their lands as wilderness. "The purpose of the Native Lands and Wilderness Council is to form an indigenous group to guide the use and management of tribal wildlands, and to demonstrate unequivocally that we are an important part of conserving wildlands globally," said Terry Tanner, work project coordinator with the Confederated Salish and Kootenai Tribe in Montana. Tanner cochaired the initial Council with Grand Chief Herb Norwegian of the Deh Cho First Nations

Figure 4—Professionals networked and built relationships across cultures. Photo by Carl Johnson.

(Canada) and Larry Merculieff, deputy director of the Alaska Native Science Commission in Anchorage.

International League of Conservation Photographers

A new working group was initiated by 40 of the world's finest conservation photographers. The International League of Conservation Photographers (ILCP) will further environmental and cultural conservation through photography and will work on global campaigns to highlight critical issues. As part of this process, more than 150 nature photographers gathered in Anchorage at the 8th WWC to determine how photographers can best contribute to the conservation community's efforts in protecting wilderness, endangered species, and threatened cultures around the world. This initiative, coordinated by Cristina Mittermeier, will be a project of The WILD Foundation.

AIDS in Africa

The Wilderness Foundation (South Africa), working with HOPE Worldwide and other partners, announced a new initiative to assist young people orphaned by the HIV/AIDS epidemic. *Umzi Wethu*—"our home"—will give orphaned young people housing, training, and jobs in the ecotourism, hospitality, and other industries. "We recognize that wilderness is a force for social change, and that this project can offer a safe and supportive environment to invest in young people in a way that is crucial to families and governments in Africa," said Andrew Muir, executive director of the Wilderness Foundation. *Umzi Wethu* training centers will combine mentoring with the transformational power of wild areas. Young people will be trained in a combination of life skills, hospitality, and conservation skills for a minimum of one year on a residential campus adjacent to Parks and Reserves for eventual employment with conservation-related companies and agencies.

Collaborative Professional Networks

- The Wilderness Policy Council (a U.S. federal interagency group) convened the first Global Wilderness Seminar for Government Agencies, involving 150 participants, the result of which was a new network of government agency professionals and wilderness managers to share information and techniques in safeguarding wilderness on public lands.

- A delegation of more than 25 Russians, principally from the Russian Far East, met in numerous settings during several days of the Congress for specific negotiations with their counterparts in Alaskan and U.S. federal land management agencies operating in Alaska. Their intent, nurtured through several pre-Congress meetings organized by The WILD Foundation with the support of the Trust for Mutual Understanding,

Figure 5—Larry Merculieff (Bering Sea Council of Elders) and Julie Cajune (Confederated Salish and Kootenai) at the Native Lands and Wilderness Council. Photo by Vance G. Martin.

was to enhance protected area management in Kamchatka and the Russian Far East through better professional links with Alaska. The collaborative network was established, and a follow-up meeting will occur in Kamchatka in 2006.

- The Africa Wilderness Network was established by the Zambezi Society (Zimbabwe) and the Wilderness Action Group (South Africa) in cooperation with the Wilderness Task Force of the IUCN.

- The World Wilderness Youth Network was established by the youth and young professionals in specific programs at the 8th WWC. An anonymous donor agreed to fund their first web portal and Internet outreach efforts.

- The Conservation Writer's Rendezvous (organized by Fulcrum, Inc) drew 40 outstanding writers from numerous countries and native communities. It reviewed the history and accomplishments of conservation writing, mentored aspiring writers, and outlined an agenda for increased effectiveness of this important voice for wilderness.

Public Outreach in Alaska

The 8th WWC Executive Committee worked closely with development, conservation, and education organizations in Alaska for two years prior to the 8th WWC. Aware that *wilderness* is often a highly polarizing word in Alaska, the Executive Committee developed numerous ways to outreach to the local community to help inform and educate Alaskans on the values of wilderness and wildlands:

- Partial and full scholarships to Alaskans, who wished to attend the Congress and had financial constraints, awarded through native groups and local conservation organizations.

- Provided free of charge to the Alaska public: an international film festival in downtown Anchorage; the WILD Expo during the Congress; and an extensive schedule of audiovisual presentations and lectures from many countries.

- A juried art competition was initiated and funded by The WILD Foundation, the result of which is a public sculpture by Rachelle Dowdy, Alaskan artist. This sculpture, consisting of four larger-than-life figures with animal heads and human torsos, was displayed at the 8th WWC and will be installed in central Anchorage, as a gift from 8th WWC to the people of Anchorage, to highlight both the important and inescapable link between wildlife and people.

Technical Information and Training

- Numerous training programs occurred before and during the 8th WWC. Thirty professionals from 21 countries completed an accredited Wilderness Management course. Fifteen youth from six countries participated in numerous communications and information trainings, worked as communications interns during the 8th WWC, and then established the World Wilderness Youth Network mentioned earlier. More than 200 scientists and managers participated in three days of almost 70 concurrent technical sessions. Two books were launched during the Congress—*Transboundary Conservation* and *The Alaska Reader* (Fulcrum, Inc.)—and numerous other publications will be produced: an illustrated trade book aimed at the mass market, a multi-volume technical proceedings published by the Aldo Leopold Wilderness Research Institute (a significant 8th WWC partner), a wilderness law and policy handbook, a manual on native management of wildlands for indigenous communities around the world, and more.

- **Resolutions—**Delegates worked hard on, debated, and eventually approved a targeted list of 49 resolutions that addressed broad conservation concerns as well as specific areas and issues needing international and local attention and action. **IJW**

Figure 6—Transboundary Conservation book launch with Cristina Mittermeier, initiator of the International League of Conservation Photographers. Photo by Carl Johnson.

VANCE MARTIN is president of The WILD Foundation, a member of the *IJW* Editorial Board, and was chairman of the 8th WWC Executive Committee.

PERSPECTIVES FROM THE
ALDO LEOPOLD WILDERNESS RESEARCH INSTITUTE

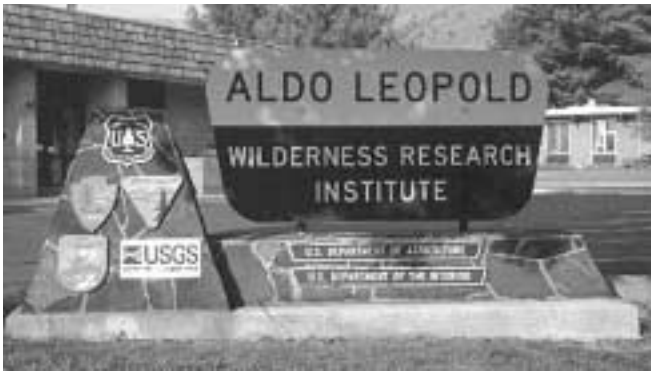
Social and Institutional Influences on Wilderness Fire Stewardship

BY KATIE KNOTEK

One of the priority research areas at the Aldo Leopold Wilderness Research Institute addresses the "need for improved information to guide the stewardship of fire as a natural process in wilderness while protecting social and ecological values inside and outside wilderness." This research topic area was developed with the knowledge that wildland fire, as a natural disturbance process, can preserve ecological conditions inside and outside wilderness ecosystems and, at the same time, influence societal values across the interface between wilderness and nonwilderness lands.

Scientists at the Leopold Institute are studying how social and institutional factors influence the way fire managers and the public evaluate trade-offs in the stewardship of fire as a natural process. Scientists map human values-at-risk to assist decision making for fire and fuels management, assess public trust in management agencies and their ability to manage fire and fuels, and investigate public perceptions and management decisions regarding options for the use of fire and fuels treatment. Funding has been primarily through the National Fire Plan (U.S. Departments of Agriculture and Interior), the Joint Fire Science Program (a partnership of six federal wildland management and research organizations), and the Bitterroot Ecosystem Management Research project (interdisciplinary team of U.S. Forest Service scientists, Bitterroot National Forest and Northern Region managers, and the University of Montana).

The Northern Rocky Mountains is a unique and valuable laboratory for investigating social issues related to fire



management across landscapes that include federally protected wilderness. Recently, the planning phase of a landscape-level fuels treatment project on the Bitterroot National Forest provided the opportunity for Leopold Institute scientists to conduct a baseline assessment of personal and community values attached to the Bitterroot landscape, which extends from the valley floor to the crest of the Selway-Bitterroot Wilderness. Using GIS technology, Leopold Institute scientists mapped the spatial distribution of these values across the landscape, providing valuable social data for modeling efforts designed to evaluate social and resource trade-offs among alternative fuels treatments. In addition, a baseline measure of trust across communities adjacent to the Bitterroot National Forest helped scientists and managers to understand the factors that influence the relationship between the public and local land managers regarding fire and fuels management. Based upon

Continued on page 12

Wilderness
In Whose Backyard?

BY GARY T. GREEN, MICHAEL A. TARRANT, UTTIYO RAYCHAUDHURI, and YANGJIAN ZHANG

Abstract: This study examined potential inequities in the distribution of National Wilderness Preservation System (NWPS) lands with respect to socioeconomic characteristics of residents in the contiguous United States. Using U.S. Bureau of Census data, we compared counties adjacent to wilderness areas with counties outside of wilderness on four socioeconomic variables (per capita income, occupation, education, and race) for 1980, 1990, 2000, and for changes from 1980 to 2000. Results show that counties adjacent to wilderness in 1980, 1990, and 2000 were composed of substantially fewer blue-collar workers, more whites, and higher-educated people. Such findings may imply that some social groups are receiving a disproportionate share of nonuse wilderness benefits than others. However, results of the trend analysis suggest this difference is beginning to narrow over time, as counties adjacent to wilderness gained white-collar occupations and nonwhite populations at a faster rate than counties not adjacent to wilderness. Implications for land use planning and decision models that incorporate human and ecological health concerns and involve mainstream environmentalists and social justice groups are discussed.

Co-authors, l to r: Gary Green on the Big Island in Hawaii, photo by Kim Mayer; Michael Tarrant in the southern Alps on the South Island of New Zealand, photo by Laura Sessions; Uttiyo Raychaudhuri; and Yangjian Zhang.

Introduction

Wilderness designation is a political compromise, with boundaries and locations determined by Congress in accord with the National Wilderness Preservation System (NWPS) (P.L. 88-577, 1964). Such compromises have continued throughout the history of the NWPS, beginning with the deflation of Howard Zahniser's drafts for wilderness designation in the years preceding 1964, through to contemporary arguments over USDA Forest Service roadless areas. A decade after the Wilderness Act was passed, Public Law 93-622, commonly known as the Eastern Wilderness Act (EWA, 1975), was enacted to provide population centers in the East with better access to the values and benefits that wilderness provides (Hendee and Dawson 2002). EWA relaxed many of the standards (including size and remoteness) required for designation that had previously kept most wilderness

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Table 1. Descriptive Statistics of Socioeconomic Characteristics for U.S. Counties

Socioeconomic variable	Mean	Std. Dev.
Per capita income 1980	$6050.00	1242.60
Per capita income 1990 (adjusted)	$7004.00	1698.04
Per capita income 2000 (adjusted)	$8386.00	1904.78
Blue-collar occupation 1980	35.86%	9.83
Blue-collar occupation 1990	32.44%	8.95
Blue-collar occupation 2000	30.45%	7.93
Attended college 1980	24.52%	9.22
Attended college 1990	35.27%	11.06
Attended college 2000	42.63%	11.21
White population 1980	88.54%	15.07
White population 1990	87.46%	15.38
White population 2000	84.75%	16.04

areas in the West. Similarly, recommendations by the Southern Appalachian Man and the Biosphere Cooperative in 1996 for additional wilderness in the East received widespread public support, but such efforts have been thwarted by legal arguments and political interests. Former President Bill Clinton's Roadless Plan, under reconsideration (i.e., shelved) by the current Bush administration, represents another example of how political the wilderness process is. Furthermore, as grassroots/community voices continue to play a prominent role in decisions about land uses (Dennis 2001) and especially wilderness designation (O'Neill 2002), the nature of local communities, and their influence on land use decisions, must be addressed. Such concerns are likely to be exacerbated with increasing numbers of people moving to undeveloped areas of the country, a process known as exurbanization (Champion 1989). Thus, an initial step in the process is to understand how these communities are changing.

Using a framework of environmental justice, this study examined potential inequities in the spatial distribution of NWPS lands with respect to socioeconomic characteristics of residents of counties adjacent (versus not adjacent) to wilderness in the contiguous United States. Studies such as this one are important in recognizing who may be receiving a greater share of the use and nonuse values of wilderness. Using U.S. Census Bureau data, counties adjacent to wilderness areas were compared with counties outside of wilderness on four socioeconomic variables (per capita income, occupation, education, and race) for 1980, 1990, 2000, and for changes from 1980 to 2000.

Framework for the Study

Following Executive Order (12898, Federal Register, 1994) all federal agencies with environmental responsibilities were mandated to address the environmental justice implications of their policies and practices. Environmental justice refers to the concept that the government has a responsibility to ensure that individuals and groups are treated fairly in the administration and practice of environmental statutes and regulations without discrimination based on race, ethnicity, and/or socioeconomic status (Floyd and Johnson 2002). The study of environmental justice has traditionally focused on inequities arising from the location of locally undesirable land uses (LULUs) such as landfills, factories, and Superfund sites. Such research has suggested minorities and low-income populations receive a disproportionate level of pollution and associated negative health consequences as compared to more affluent white populations (see for example, Boerner and Lambert 1995; Bullard 1994; Commission for Racial Justice, United Church of Christ 1987; Mohai and Bryant 1992). Our study focuses on the opposite end of the spectrum by examining how environmental justice (as a study of equitability) applies to positive or *locally desirable land uses* (LDLUs).

Recent studies have recognized that environmental justice applies both to the places where we play (e.g., rivers and mountains) as well as areas in which we live and work (Di Chiro 1998; Salazar 1998; Porter and Tarrant 2001; Tarrant and Cordell 1999). Indeed, precedence for environmental justice, Title VI of the Civil Rights Act of 1964, recognizes that injustice applies to the distribution of both costs and benefits associated with government environmental actions. Title VI provides that "no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance" (in Foreman 1996, p. 23). As such there are increasing calls for environmental justice research to examine the environmental "goods" as well as "bads" in order to ensure that all populations receive an equal share of government benefits and costs (Salazar 1996; 1998). The study of environmental goods in the context of this study refers to federally protected wilderness areas, and how these areas are perceived as LDLUs.

Wilderness is a locally desirable land use. People value natural areas for the

ecological services they provide as well as the social benefits that individuals derive from them (Landres et al. 1988). For a large majority of the American public, lands protected under the NWPS provide both use and nonuse values/benefits (Cordell, Tarrant, McDonald, and Bergstrom 1998). Use values of wilderness comprise direct, indirect, and option values, whereas nonuse values are derived from preserving lands in their pristine condition, and include existence, bequest, and intrinsic values (Mountford and Kepler 1999). Direct use values are wilderness attributes and services that can be traded, consumed, or used as an input to commercial activities (e.g., expenses associated with wilderness recreation equipment and travel). Indirect uses concern those wilderness attributes and services that provide value to the well-being of humans through the maintenance of natural systems (e.g., provision of clean air and water). Option values are preferences people make to retain the option of having or using wilderness attributes and services in the future. Existence values are the values that humans place on wilderness for its very existence, independent of any present or future on-site use of the area (e.g., spiritual and symbolic aspects of wilderness). Bequest values represent the value that people derive from maintaining wilderness attributes and services for use or nonuse by future generations. Intrinsic values are the qualities that wilderness possesses inherently, regardless of human existence.

Whereas some of these values exist independent of one's geographic proximity to wilderness (i.e. they are widely distributed across all segments of American society), many of the values accrue greater benefits to residents living on the fringe of wilderness than to distant residents. For example, clean air and water, scenic vistas, recreation opportunities, and option values (such as federal protection of lands from future development) are more accessible for people who live nearby wilderness than for urban residents. Furthermore, although several values may have some associated costs (e.g., noise and pollution from recreation/tourism traffic and peripheral housing development, etc.), federally designated wilderness areas arguably provide some of the highest level of environmental goods and therefore warrant being addressed under Executive Order 12898. Indeed, a major impetus for wilderness preservation in this country was the protection of the Adirondack Preserve in New York to provide a vital watershed to nearby populations (Nash 1967), and 88 USDA Forest Service wilderness areas have been designated the highest standard (Class 1) for air quality (Stokes 1999). As such, wilderness areas may be considered one example of a locally desirable land use; in other words, unlike hazardous waste sites, industrial development, and/or residential sprawl, the environmental benefits of living near wilderness probably outweigh the costs.

Objectives of the Study

This study seeks to establish wilderness as a land use that people desire in their backyards (Wilderness in My Backyard, WIMBY). We compare the social and economic characteristics of residents of counties adjacent to wilderness (i.e., living with wilderness in their backyard) versus those in counties that are not adjacent to wilderness. Census data from 1980, 1990, and 2000 were used to examine trends in population migration (i.e., changes in socioeconomic characteristics across time) to/from wilderness counties in the contiguous United States. The objectives were (1) to compare the socioeconomic characteristics of residents of counties adjacent to wilderness and those not adjacent to wilderness in 1980, 1990, and 2000; and (2) to examine the change in socioeconomic characteristics of residents of counties adjacent to wilderness and those not adjacent to wilderness from 1980 to 2000.

Methods

Wilderness-area shape files were downloaded from the National Atlas of the United States website (2002) and county data (shape files and attribute information) was retrieved from the *Census CD Version 2.0* (GeoLytics 1998). Geographically distinct units of all wilderness areas (n = 993) and all counties (n = 3,111) within the contiguous states were included in the analysis. (Some wilderness areas contain more than one physical/geographic land unit.) Shape files are digital vector-based polygons/representations of geographic entities with attached tables containing attribute information. In the case of wilderness-area shape files, only limited attribute information was available (e.g., name and geographic coordinates). For county shape files, attribute information included per

Table 2. Descriptive Statistics of Change (from 1980 to 2000) in Socioeconomic Characteristics for U.S. Counties

Socioeconomic variable	Mean	Std. Dev.
Percent change in per capita income (adj.) 1980 to 2000	39.71%	20.19
Percent change in blue-collar 1980 to 2000	-13.60%	16.49
Percent change in attended college 1980 to 2000	81.97%	32.08
Percent change in white population 1980 to 2000	-4.04%	16.51

capita income, race, education, and occupation. Attributes for feature type, feature name, agency ownership, uniform resource locator, state, and state Federal Information Processing Standard codes were retained. The minimum map resolution included in the data is an area of 640 acres, (257 ha) or one square mile. Using ESRI's Arc/INFO GIS software, the data set was checked for label errors, dangling nodes, and intersections. Using the BUILD command thereafter, the polygon topology was built for the data set. Counties that included wilderness areas, shared a boundary with a wilderness area, or were within 1,500 meters (approximately 1 mile) of a wilderness boundary were considered "adjacent counties." A 1,500-meter cutoff was used to be consistent with previous studies of environmental justice (see for example, Glickman 1994; Hamilton 1995; Kriesel, Centner, and Keeler 1996; U.S. General Accounting Office 1995) in which a definition of proximity/adjacency was required.

Per capita income was measured as a continuous level variable in dollars. The consumer price index was used to adjust the 1990 and 2000 values for inflation (www.bls.gov). The 1990 adjusted value was reduced by a factor of 0.63 from the actual 1990 value, and the 2000 adjusted value was reduced by a factor of 0.48 from the actual 2000 value. Occupation was categorized as percent of the total workforce classified in blue-collar occupations (farming, construction, production, transportation, and installation) versus white-collar and service occupations. It was calculated as number of blue-collar employees divided by total employees. Education was classified according to percent of the population who had attended college for at least one year and was computed as the total population who had attended at least some college (from freshmen to doctoral graduates) divided by the total population older than 25 years. Race was categorized as percent of the total population white (including white Hispanics) versus nonwhite (composed of African American, Native American Indian, Asian, and other). It was calculated as white population divided by the total population.

Percent change in each of the socioeconomic variables (from 1980 to 2000) was computed as follows: (2000 value minus 1980 value)/1980 value. The buffer distance was equal to 1,500 meters (approximately one mile) and measured as the distance from the boundary of a census unit (county) to the boundary of the wilderness shape file.

Data were spatially represented in ArcView GIS software, version 3.2 (Environmental Systems Research Institute 1999) using the Albers Equal Area projection in metric units. The buffer analysis in GIS enabled the creation of a 1,500-meter buffer around the polygon of each wilderness area and subsequent counties within (and outside) the buffer identified. The problem of representing the whole census unit with just one average census data was addressed. To solve this problem, the county boundary was delineated using the interpolation method of GIS. The socioeconomic variables of the new created county were calculated from the census block groups within the new created boundary. Data from the spatial analysis was then exported to SPSS (Statistical Package for the Social Sciences 2001) version 11.0 for further statistical analysis.

The two objectives were tested using an independent sample T-test. The independent variable was dichotomous (i.e., 0 representing counties adjacent to wilderness, and 1 representing counties not adjacent to wilderness). The dependent variables were per capita income, percent blue-collar occupation, percent attended some college, and percent white for 1980, 1990, 2000, and change from 1980 to 2000. Since population (and not sample) data were used, significance tests were not applicable; rather, the T-statistic and effect sizes (ranging from 0 to 1.0) for both objectives were interpreted. (For comparative purposes, a T-statistic greater than 1.65 implies a significant difference at the $p = .05$ level for sample data.)

Results

The means and standard deviations of the four socioeconomic characteristics for all counties in the 48 states across 1980, 1990, and 2000 are shown in Table 1. From 1980 to 2000, per capita income increased by almost 39.7%, blue-collar occupation decreased by 13.6%, college attendance increased by almost 82.0%, and the percent of white population decreased by 4.0% (see Table 2).

Objective 1: Figure 1 shows the distribution of wilderness areas in the contiguous United States, whereas Figure 2 displays counties by per capita income for the change from 1980 to 2000. Together with Table 3, the results show that counties adjacent (versus not adjacent) to wilderness differed considerably on at least three of the four socioeconomic variables (occupation, education, and race) in 1980, 1990, and 2000. For all three time periods, counties adjacent to wilderness areas were more likely to be white, to have attended college, and have slightly higher per capita incomes, and were less likely to be in blue-collar occupations than counties not adjacent to wilderness. With the exception of per capita income, the effect sizes (a) were not only moderate to large (greater than .10), suggesting the differences are substantial, but also (b) exhibited a consistent pattern in trends (from 1980 to 2000), suggesting that the differences are narrowing over time (see also objective 2).

Objective 2: Table 3 also displays the percent change in each of the four socio-

economic variables from 1980 to 2000 by proximity to wilderness. Counties adjacent to wilderness exhibited greater decreases in white populations and blue-collar occupations (d = .11 and .20, respectively) and a lower increase in college attendance (d = .35) than counties not adjacent to wilderness. There was very little difference in per capita income (d = -.06). Whether these results show (1) a trend in population migration patterns and/or (2) that people currently living in counties adjacent to wilderness are less likely to seek blue-collar employment and/or to receive higher education levels than people living in counties not adjacent to wilderness is unknown.

Discussion

Before discussing findings of the study, some limitations must be addressed. First, we chose to examine only wilderness in the contiguous (as opposed to the entire) United States in part because of the lack of comparable data sets (notably changing county boundaries), but also because the social and geographic characteristics of the states of Alaska and Hawaii are so different from the rest of the country (much more so than between the eastern and western contiguous United States). For example, including Alaska, which contains more than one-half of the NWPS lands and a tiny fraction of the U.S. population, would have biased the sample considerably. In sum, a valid argument could probably be made for either including or excluding both states. We chose to exclude them and limit our findings to the 48 contiguous states. Such exclusion is not unique in recent studies of demographic trends and natural lands in the United States; for example, Cordell and Overdevest (2001) also limited their analyses of changing demographics and land patterns to the contiguous 48 states.

Second, we argue that residents of adjacent counties benefit more from wilderness than nonadjacent counties and that environmental justice is an appropriate framework for such analyses. This argument is based on the viewpoint that many use and nonuse values of wilderness are realized by residents from all across the country (such as bequest values and existence values). The *opportunities* for receiving some of them (especially aesthetic values and indirect values such as clean air and water) are arguably greater the closer one lives to the protected area. Furthermore, whereas we acknowledge that the designation of wilderness (or similarly protected) areas is not made on the basis of environmental justice, the environmental justice mandate requires governmental agencies (that include the US Forest Service, National Park Service, Bureau of Land Management, and Fish and Wildlife Service) to determine the *costs and benefits* of such land allocation decisions for peoples of color and low income.

Conclusions

It has been argued that the key factors that influence the spatial distribution

Table 3. T-test of Differences in Counties Adjacent to and Outside of Wilderness Areas in the United States

	Outside of wilderness		Adjacent to wilderness			
Socioeconomic variable	Mean	Std. dev.	Mean	Std. dev.	T-test	Effect
Per capita income 1980	$6042.00	1230.72	$6096.00	1313.81	-0.83	-0.04
Per capita income (adj.) 1990	$6993.00	1673.21	$7072.00	1843.69	-0.90	-0.05
Per capita income (adj.) 2000	$8366.00	1851.55	$8509.00	2201.79	-1.46	-0.07
Percent change in per capita income 1980 to 2000	39.53%	19.77	40.83%	22.59	-1.24	-0.06
Blue-collar occupation 1980	36.09%	9.84	34.45%	9.65	3.23	0.17
Blue-collar occupation 1990	32.69%	8.94	30.91%	8.85	3.85	0.20
Blue-collar occupation 2000	30.78%	7.91	28.39%	7.75	5.86	0.31
Percent change in blue-collar 1980 to 2000	-13.15%	16.56	-16.43%	15.79	3.84	0.20
Attended college 1980	23.78%	8.55	29.03%	11.61	-11.22	-0.52
Attended college 1990	34.56%	10.58	39.61%	12.84	-8.94	-0.43
Attended college 2000	41.93%	10.83	46.95%	12.48	-8.77	-0.43
Percent change in attended college 1980 to 2000	83.54%	31.79	72.28%	32.21	6.81	0.35
White population 1980	88.12%	15.58	91.13%	11.12	-3.86	-0.22
White population 1990	87.01%	15.92	90.21%	11.17	-4.04	-0.23
White population 2000	84.46%	16.54	86.54%	12.41	-2.52	-0.14
Percent change in white population 1980 to 1990	-3.82%	17.41	-5.36%	9.16	1.81	0.11

Figure 1—Distribution of wilderness areas in the contiguous United States

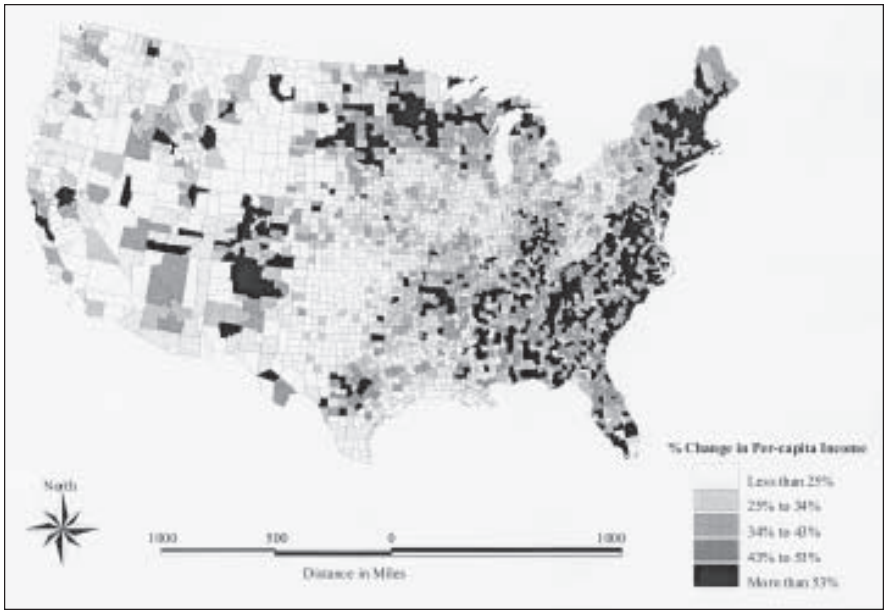

Figure 2—Percent change in per capita income for counties in the contiguous United States, 1980 to 2000

of locally desirable and undesirable land uses are political and economic (Bryant and Mohai 1992). If wilderness lands are considered a desirable land use and their designation and boundaries are politically determined, the environmental justice mandate (Executive Order 12898) has implications for understanding the potential inequities associated with where wilderness is located. A first step in this process is identifying who is likely to receive a greater share of the benefits derived from wilderness. Although living near wilderness does not ensure that local residents receive all the environmental goods of wilderness, it does provide local populations with amenities such as clean air and water, easier geographic access to recreation and solitude, and an undisturbed pristine environment in their backyard. Furthermore, these amenities are preserved using public tax dollars and, unlike private or some other public lands, wilderness is unlikely to be targeted (at least in the near future) for industrial, commercial, or residential development. One question this raises is whether people who benefit from their proximity to wilderness should bear a higher tax burden than those who receive fewer wilderness benefits. Although our results imply such a policy warrants reasonable consideration, clearly, one study alone is insufficient to substantiate these claims.

Our article is based on the assumptions that (1) the environmental justice mandate applies to desirable as well as undesirable land uses, (2) wilderness is a locally desirable land use, and (3) the benefits of wilderness are typically greater at the local (versus nonlocal) level (although some benefits occur independent of geographic distance, such as bequest values). Results show that unlike traditional environmental justice studies, income was not found to be a substantial explanatory factor in the location of wilderness areas. However, counties adjacent to wilderness in 1980, 1990, and 2000 were composed of significantly fewer blue-collar workers, more whites, and higher-educated people. Such findings may imply that some groups are receiving a greater share of nonuse wilderness benefits than others. Furthermore, results of the trend analysis (from 1980 to 2000) suggest the gap between wilderness and nonwilderness counties is narrowing in terms of (1) percent of white population (i.e., wilderness counties are becoming more nonwhite at a faster rate than nonwilderness counties), (2) percent blue-collar (i.e., wilderness counties are becoming more white-collar at a faster rate than nonwilderness counties), and (3) percent attended college (i.e., wilderness counties are becoming more educated at a slower rate than nonwilderness counties). The question remains as to whether these findings represent an environmental injustice.

Environmental justice is understood as an act that will prevent people

from experiencing environmental justice. To the extent that wilderness designation favored local counties composed of more white- (versus blue-) collar, more whites (than nonwhites), and higher- (versus lower-) educated people, there may be some cause for concern. (Although this has clearly been tempered by the narrowing in trends from 1980 to 2000.)

Certainly, the decision to designate an area as part of the NWPS is a highly contentious and political issue that requires local community input (for example, as part of the National Environmental Policy Act, 1969 and National Forest Management Act, 1976). Although minority communities (represented by low income and people of color) have traditionally been less influential than white affluent communities in land use decisions (in part because of mistrust, lack of representation, and/or unsuccessful collaboration with government organizations) (see for example, Dennis 2001; Wondolleck and Yaffee 2000), much less is known about the effect of occupation and education on the land use decision-making process. Given the strong correlations among income, occupation, and education, powerful community groups (i.e., those with the greatest ability to influence and exhibit strong interest) in environmental issues are likely to include people with higher education and white-collar employment. It is unlikely, however, that there has been any evidence of overt discrimination (i.e., intentional targeting of certain communities) in the distribution of wilderness areas. Our results show only correlational support for white-collar, white population, and higher-educated counties and does not address deliberate actions on the part of any federal agency to discriminate in favor of one particular social group. Based on the emerging trends, the need for a sustainable development model is highly desirable.

Social justice concerns in land use planning have only recently received scientific attention. Social equity in the planning process was articulated in Campbell's (1996) triangle model, in which the three basic and conflicting goals of planning (economic development, environmental protection, and social equity) are represented. The act of balancing the three goals in a public process has been a source of conflict and tension and quite often has resulted in lopsided/biased preferences in the balancing act. This is particularly profound and true in circumstances where certain parties/agencies as part of the public process have more resources (financial and political power) than other parties, resulting in situations where the distribution of environmental goods and the social goals have to be bargained and often results in the weaker population being marginalized. Such considerations are at the heart of models of sustainable development and are clearly applicable to studies of environmental justice. The present study provides findings that support the need for a more sustainable model of land use planning and designation (with specific implications for wilderness areas).

Interestingly, issues of environmental injustice were not included in the works of many classical writers of the environmental movement (e.g., Abbey, Carson, Leopold, etc.). Yet, today environmentalists share much in common with social/environmental justice advocates, and over the past decade there have been increasing calls for the two groups to unite (1995; Bullard and Wright 1992; Costner and Thornton 1990; Dunlap and Mertig 1992). Although mainstream environmental groups (such as Greenpeace, the Sierra Club, The Wilderness Society) have traditionally been composed of affluent educated white members concerned with the health of the physical community, and environmental justice groups have included mostly poor, working-class, and minority groups focused on the health of the social community, clearly the two groups have at their core a similar goal—redressing the effect of human activities on ecosystem conditions. It would be desirable to foster a more unified front among people to advance the implications of social and environmental justice and pave the way toward a better future.

This study has been a macro-level analysis based on GIS and simple descriptive statistics. Future research for an improved and in-depth understanding would presumably include more micro-level analysis such as face-to-face interviews, including participatory mapping and participant observation. A detailed qualitative study would tease out the existing intangible, socially constructed definitions of place and attachment, which are historically and culturally constructed, and which have ultimately resulted in space and place marginalization by minority groups (Johnson et al. 2001).

One of the greatest challenges facing land managers and the NWPS is continued development at the wilderness boundaries, as these are areas associated with population explosion and migration. Views on how these areas should be used and managed should include an approach to integrating environmental and social equity concerns by targeting efforts aimed at sustainable development. In the case of undesirable land uses, poor communities are often forced to make the no-win choice between economic survival and environmental quality (Campbell 1996). In the case of desirable land uses, those without the political will or influence may be receiving a lower share of the benefits of environmental

decisions. Regardless of either case, economic segregation inevitably leads to environmental segregation, and unless underrepresented communities engage in the policy debate about environmental sustainability they will continue to receive a greater share of the costs and less of the benefits of more affluent communities. Ultimately, by demonstrating the costs and benefits of land use decisions for both human and ecological communities (whereby indicator species may include both human as well as physical features), the two groups may find they are fighting for similar outcomes. The challenge is for land use planners to include such outcomes in models of sustainability and to determine how we might make land use choices that are in our collective (social and environmental) best interest (Yaffee 1994). **IJW**

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Changes in the Aftermath of Natural Disasters

When Is Too Much Change Unacceptable to Visitors?

BY JOSEPH FLOOD and CRAIG COLISTRA

Over the past decade, the forces of nature have indelibly altered some wilderness landscapes and, as a consequence, permanently changed how visitors use these areas. Several critical questions confront managers: "Should management actions be implemented to protect what nature has reconfigured, or should managers restore campsites and trails to previous conditions?" Is it appropriate for visitors who have visited a particular site over many visits, and find it either dramatically altered or nonexistent, to manipulate the site to accommodate their expectations? A close review of two recent changes to wilderness landscapes through the forces of nature in a national park and a national forest wilderness offers insight into this management dilemma.

On the morning of September 8, 2004, Hurricane Francis blew into North Carolina. Linville Gorge Wilderness, located in western North Carolina was a pristine and serene landscape. After sixteen inches (41 centimeters) of rain fell in the span of 48 hours, the Linville River unleashed a twenty-foot (6-meter) wall of water through the gorge, which devastated everything in its path. In the spring of 1997, Yosemite National Park experienced a similar scenario as the Merced River swelled to flood stage, leaving behind a path of devastated cabins, roads, campgrounds, and trails.

There is no clear understanding of how catastrophic events such as hurricanes, tornadoes, drought, fire, and mass flooding alter wilderness landscapes and influence or change visitor experiences in wilderness. Questions remain regarding ensuing management dilemmas: How, if at all, should managers play a role in controlling natural changes and restoring trails and campsites to preexisting conditions? If we take direction from Section 2(c) of the Wilderness Act of 1964 (Public Law 88-577), wilderness "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable." Does this suggest to managers that a hands-off approach should be followed, or does this suggest restoration of what has been changed by the forces of nature? The Wilderness Act of 1964 sets the tone for management actions that result in preserving or restoring natural conditions. McCool and Lime (1988) argued that management actions, whether designed to preserve resources, enhance opportunities, or reduce conflict, can negatively impact visitors. Researchers have been divided between the hands-off versus the restoration approach to fostering a quality visitor experience. The management community is divided between those who invite the opportunity to create or enhance visitor satisfaction and expectations and those who do not. These concerns foster either a sense of pessimism or a desire for a better understanding of how management actions (or no action) influence the quality of the visitor's experience (Flood 2003b).

Research findings suggest new generations of wilderness visitors may have different expectations about what management actions are appropriate (Cole et al. 1997; Vaske et al. 1980; Watson and Cronn 1994). Visitors who have grown accustomed to a particular wilderness campsite, or wilderness landscape, often experience upset or stress upon returning to a drastically altered condition. It has been suggested that when visitors first visit an area, a form of benchmarking occurs (Flood 2003a). This benchmarking influences how visitors evaluate site conditions during future visits. These factors may influence both visitor motivation and expectations as they plan to revisit their favorite wilderness locations.

Understanding Visitor Behavior

Social psychologists have documented that people use standards to evaluate a setting and what influences their expectations for an experience. Different individuals may have different expectations for the same activity or setting. When a situation is substandard to what a person defines as appropriate or expected, the experience is more likely to be evaluated

Figure 1—The Bynum Bluff area in the Linville Gorge after the flood and during the postflood reinventory of campsites and trees. Photo by Joseph Flood.

negatively (Vaske et al. 1980; Watson and Cronn 1994). Vaske and others suggest that visitors with no prior expectations of a wilderness setting are susceptible to accepting what they see during their first visit as being appropriate (i.e., benchmarking). Expectancy theory suggests that the determinants of human behavior are the beliefs, expectations, and anticipation individuals have concerning future events (Steers and Porter 1987). Expectancy theory illustrates how on-site conditions influence visitors' experiences before and during a wilderness visit. Wilderness visitor behavior is goal directed and based on conscious decisions, and Lawler (1973) suggests that people engage in behaviors that provide positive outcomes. Similarly, expectancy-valence theory (Ajzen and Fishbein 1980) has been used in wilderness settings to help understand how the role of expectation and on-site conditions influence the wilderness experience (Hall and Shelby 1993). The wilderness resource conditions selected by the visitor are remembered with the expectation that it will once again lead to their desired wilderness experience during the next trip. Therefore, the conditions existing during a visitor's initial exposure to a specific campsite or trail establish a benchmark influencing subsequent visits (Flood 2003a). These theories suggest then that a drastic change in on-site conditions at a recreation site could create an expectation dilemma for some visitors (i.e., the current situation does not match their previous benchmark).

Two Examples of Landscape Changes from Flooding

For decades, Yosemite National Park managers have been challenged by the 1916 legislative mandate that defines the park's mission as "conserving the scenery" while "providing for the enjoyment" of the American public. As 17,000 visitors view El Capitan, spectacular waterfalls, and giant granite rock formations each day, their very presence creates significant impacts and demands on park resources. The sheer numbers of visitors have forced managers to address tough, controversial challenges such as providing housing for park rangers and concessionaires, and whether or not to eliminate poorly located campsites and trails built within the flood plain. In the spring of 1997, after a winter that created an exceptionally heavy snowpack high in the Sierra Nevada Mountains, a tropical storm struck. It melted the snowpack and created torrential rains that swelled the Merced River to flood stage. After several days, the storm subsided, leaving hundreds of cabins, roads, campgrounds, wilderness campsites, and sections of trails totally destroyed. Whereas some local concessionaires indicated that the park was devastated, others suggested that this "act of nature" was needed to reset priorities for the park. Rather than evaluating the effects of the storm as an all-encompassing negative, managers chose to forgo replacing or rebuilding many structures and campsites, while reestablishing more ecologically sound trail systems in alternative routes and locations.

On September 8, 2004, Hurricane Francis left a path of debris, dislocation, and destruction across much of western North Carolina. The 12,000-acre (4,858-hectare) Linville Gorge Wilderness, located on the Pisgah National Forest, received 16 inches (41 centimeters) of rain over a period of several days. The runoff caused the Linville River to swell from a 7,000 to 35,000 cubic feet (198 to 992 cubic meters) per second flow (http://steepness.bogsspot.com/2004), and a 20-foot (6-meter) wall of water moved, altered, or eliminated nearly everything in its path along the riverbank. One frequently visited area of the wilderness, Bynum Bluff camp area, was totally obliterated. While local U.S. Forest Service managers closed much of the area for safety reasons and began rebuilding heavily damaged roads and trails, visitors were working independently and without authority to rebuild some lost campsites that were important to them.

Campsite Conditions in the Linville Gorge Wilderness

A campsite inventory database for the Bynum Bluff area had been conducted on February 24–26, 2004, prior to the flood, and there were approximately 150 trees and 16 campsites. After the flood, only three undisturbed campsites remained intact. During a postflood reinventory process, researchers found only 42 trees, four visitor re-created campsites, and the three original sites that together covered an area of 3,000 square feet (278 square meters) (see Figure 1). During a second reinventory trip on April 1–3, 2005, researchers observed that four new visitor-created sites had been established by moving debris (trees, rocks, and large boulders) and using surrounding sand and gravel for leveling out the sites (see Figure 2). Researchers estimated that the total of 10 sites covered an overall area of 3,406 square feet (316 square meters), an increase of 406 square feet (38

square meters) in campsite area since the first postflood reinventory.

Management Dilemma

If there were originally 16 campsites and now there are 10, should managers allow this activity or discourage it? Does the act of moving debris and boulders, and leveling out sand and gravel constitute appropriate visitor behavior or not? When do acts of nature rule, and when should visitors be told that acts of nature will dominate? Although this management dilemma demonstrates what can happen under unusual catastrophic conditions, this author argues that visitors have often altered wilderness campsites to best meet their needs and expectations. In many instances what managers have done, or failed to do, may reflect some of an agency's philosophy about wilderness management. Although there has been a concerted effort by the Arthur Carhart National Wilderness Training Center during the past decade to "foster interagency excellence in wilderness stewardship" for all wilderness managers working for the four management agencies, individual agencies continue to address similar problems differently. The two case examples here highlight that in these instances the National Park Service may take a different approach from the U.S. Forest Service when it comes to issues of natural forces transforming the landscape and of visitor alteration of wilderness. However, little attention has been given to determining how to best address the issues of how to react to natural transformations of the landscape and whether visitors should be allowed to alter a site to re-create preexisting or new on-site conditions.

The intent of this article is to encourage a dialogue between researchers and managers on how to best handle significantly altered landscapes after the occurrence of a natural disaster from both a visitor and a management perspective. For example, catastrophic flooding events may be increasing in coming years as meteorologists and climatologists predict that global warming will result in unusual and dramatic changes in weather patterns worldwide. Rivers and streams may swell and flood, or evaporate, under unusual weather conditions affecting many popular campsites currently located along riverbanks and corridors or mountain valleys. Perhaps one approach is visitor education about natural processes and conditions in wilderness and how the forces of nature may drastically alter the landscape. Perhaps another approach is to conduct in-depth studies, asking managers about accepting catastrophic landscape change, conducting management-initiated restoration to former conditions, or allowing visitor-initiated restoration alterations to improve recreation opportunities. Managers should be proactive in their planning and anticipate visitor reactions and agency management responses to significantly altered landscapes after the occurrence of a natural disaster in a wilderness area. **IJW**

Figure 2—Campsites constructed by campers in the Bynum Bluff area of Linville Gorge after the flood. Photo by Joseph Flood.

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Wilderness Conservation in a Biodiversity Hotspot

BY RUSSELL A. MITTERMEIER, FRANK HAWKINS, SERGE RAJAOBELINA, and OLIVIER LANGRAND

Endemic Richness

The island of Madagascar is one of the world's highest biodiversity conservation priorities. It is considered one of the most important of the world's 18 megadiversity countries (Mittermeier et al. 1997) and one of the very highest priority biodiversity hotspots as well (Mittermeier et al. 1999; 2004). Madagascar's privileged position in terms of biodiversity is based on its geological history and geographic placement. The world's largest oceanic island—and the fourth largest island overall—has been separated from the African mainland for more than 160 million years, so most of its plant and animal life evolved in isolation. This resulted in very high levels of endemism at the species level. Madagascar is situated largely in the tropics (between 11° 57' S and 25° 37' S) and also has very high species richness, especially given its relatively small size (587,041 km^2) (226,600 mi^2). For example, although Madagascar occupies only about 1.9% of the land area of the African region, it has more orchids than all of mainland Africa, and indeed is home to perhaps as much as a third of all African plant species. Overall, about 83% of Madagascar's plant species are endemic (Goodman and Benstead 2003), and for animals the proportion is usually even higher, the best example being the primates, which are 100% endemic.

While Madagascar's species richness and endemism is impressive, it excels in endemism at higher taxonomic levels. As a country, Madagascar's numbers of endemic plant and animal families and genera are rivaled only by Australia, which is 13 times larger. As a hotspot, Madagascar is simply unmatched in these categories. Indeed, the Madagascar and Indian Ocean Islands hotspot has unsurpassed endemism at the family and genus level, with a staggering 24 endemic families and 478 genera of vascular plants and vertebrates. The next highest on the list at the family level are the New Caledonia, New Zealand, and the Chilean Winter Rainfall/Valdivian Forests hotspots, each with seven, and for genera the Caribbean, with just 269 (Mittermeier et al. 2004). This means that Madagascar is critically important not just for conservation of species, but for conserving a whole array of deep evolutionary lineages representing a significant portion of our planet's evolutionary history.

Co-authors Russell A. Mittermeier (left) and Frank Hawkins.

This evolutionary history is demonstrated by lemurs that are the nonhuman primate radiation in Madagascar, arguably the single highest primate conservation priority on Earth. The 69 lemur species and subspecies found there are divided into five families and 15 genera, all of which are endemic, a level of endemism simply unmatched on our planet. Brazil, the world's single richest country for primates, with 104 species, also has five families and a total of 18 genera; however, none of the families and only three of the genera are endemic in a land area many times larger than Madagascar. Furthermore, if one takes into consideration the lemurs that existed on Madagascar until very recently, the numbers are even more striking. When our species first arrived on Madagascar just 2,000 to 2,500 years ago, there were eight other genera and at least 16 other species of lemurs present in addition to the extant forms. These extant forms were all larger in size than the living lemurs, some of them giants, with one species growing to be

larger than an adult male gorilla. Some of these survived until perhaps as recently as 300 to 400 years ago, but all are now extinct.

The statistics for other animal and plant groups are comparably impressive. Plant endemism is extremely high at seven to eight endemic families; there are five endemic bird families; reptiles are represented by 340 species, of which 314 are endemic; and amphibians are at about 217 species, of which 215 are endemic. Invertebrate diversity and endemism are extremely high, but we are only now starting to fully understand it.

Environmental Impacts

Sadly, Madagascar is also one of the world's leaders in environmental loss. The threats to Madagascar are well documented, with forest destruction through slash-and-burn agriculture, mining, and logging being the primary causes of habitat loss. It is estimated that around 90,000 km^2 (34,740 mi^2) of closed-canopy primary forest and woodland remained as of 2000, with an average annual rate of loss during the 1990s of 0.9% per year (M. Steininger 2005). Burney (2003) estimates that historically most of the island would have been covered in forested or densely vegetated habitats, so nowadays only around 15 to 20 % of original primary vegetation remains. However, after spending a lot of time flying over many different parts of Madagascar, we doubt that more than 10% of the forest remains sufficiently intact to be the subject of concerted conservation efforts, much of it being so fragmented that little can be done to save it at this time. At best, we believe that perhaps 50,000 to 60,000 km^2 (19,300 to 23,160 mi^2) remains in a state that is still worth protecting. If this is so, then the sobering fact emerges that all the amazing biological wealth of Madagascar is packed into a tiny land area.

Erosion in some parts of Madagascar, especially in extensive areas of the central plateau, is simply staggering, and as severe as anywhere on Earth. Indeed, when flying over parts of the country, one is almost brought to tears by enormous erosion gullies, locally known as *lavaka*, and by the fragmentation and continuing burning of small patches of vegetation to achieve only a couple of years of low-level agricultural productivity—a tragic loss of biodiversity and a loss of future potential for the human population as well. Wetlands, including lakes, rivers and marshes, are under threat from transformation to rice fields, siltation from soil erosion, and introduced nonnative species.

Lemurs and other mammals such as carnivores, tenrecs, fruit bats, some birds, and some reptiles (e.g., tortoises) are very susceptible to hunting. The importance of hunting is now emerging as a much more serious environmental problem than previously believed. The international pet trade has had a serious impact on endemic plants and animals of Madagascar, especially amphibians, reptiles, and succulent plants. In addition, the proliferation of exotic plant species is recognized as a major threat affecting the biodiversity of Madagascar, and freshwater ecosystems, in particular, have been seriously impacted by alien plants such as *Eichhornia crassipes* (Langrand and Goodman 1995). This combination of very high biodiversity, amazing levels of endemism, and severe threat have combined to make Madagascar one of the world's highest biodiversity conservation priorities. Indeed, in the opinion of many, it should be considered the single highest priority biodiversity hotspot, and the international community needs to make serious investments now. New investments need to be far in excess of what has been invested in the past. New viable long-term plans developed by working closely with the government of Madagascar and private initiatives

Figure 1—Highway of the Baobabs, near Morondava in southwest Madagascar. Photo by Russell A. Mittermeier, Conservation International.

Figure 2—Devastating erosion in Madagascar. Photo by Russell A. Mittermeier, Conservation International.

Figure 3—Local Antanjaka people waiting for us at our vehicles, Mahabo Forest Reserve, June 19, 2005. Photo by Russell A. Mittermeier, Conservation International.

could support conservation and environmentally sound development.

Protected Areas

Clearly much needs to be done, and, fortunately, good things are beginning to happen. Protected areas are critical. At present, the protected area network of Madagascar (IUCN Categories I–VI) covers some 1.7 million hectares, (4.2 million acres) or about 3% of the country. Recent gap analyses conducted by Conservation International and partner organizations (including the Missouri Botanical Garden, the Wildlife Conservation Society, the World Wildlife Fund, the Durrell Wildlife Trust, and the Malagasy NGO Fanamby), indicated that the coverage of Madagascar's unique biodiversity by this network was far from adequate and that a significant increase in protected area coverage was necessary. President Marc Ravalomanana, who took power in 2002, recognized the value of protecting the country's natural heritage, and, to demonstrate his commitment, made an historic declaration to triple his country's protected area coverage at the World Parks Congress in Durban, South Africa, in September 2003. At the same time, he requested the support of the international community to the tune of a $50 million trust fund to help make this all a reality. This was met with much international approval and has resulted in a great deal of conservation activity within Madagascar. The international community has already committed $40 million toward this fund in less than two years, while the government has created a Durban Vision Group to identify new areas to be protected. By the end of 2005, it is expected that some 1.5 million hectares (3.7 million acres) of new areas will have been designated and on the path to the ultimate total of 6 million hectares (14.9 million acres).

In addition, Madagascar has received a totally unexpected and quite amazing windfall from Hollywood, in the form of a new full-length animated film entitled *Madagascar*, produced by DreamWorks, one of the Hollywood's leading companies. This film, which premiered at the end of May, portrays Madagascar in a very positive light and is in the process of making it a household word in North America, Europe, and around the world. Preliminary indications are that it will be seen by 100 million in theaters and by another 200 to 300 million in their homes using DVD versions. This movie is likely to stimulate a great increase in tourism to Madagascar. Both the international conservation community and the government of Madagascar are moving quickly to take advantage of this unique and historic opportunity. The president has created a Task Force on Ecotourism reporting directly to his office, and Conservation International has placed a highly experienced ecotourism specialist in the president's office. Other national and international organizations are moving quickly to stimulate investments in tourism. The most recent unofficial reports indicate that there has already been a substantial increase in tourist interest for 2006.

All of this bodes well for the future, but what is the role of the wilderness concept in a country like Madagascar, where so much has already been lost and where most of the protected areas are significantly smaller than 100,000 hectares (247,000 acres)? We believe that the wilderness concept does in fact have great value in Madagascar and that it fits in very well with the conservation corridor concept that organizations such as Conservation International, World Wildlife Fund, the Wildlife Conservation Society, the Institute for the Conservation of Tropical Environments, and the Malagasy NGO Fanamby are trying to promote. This is especially relevant in the eastern rain forest region of the country, where much of Madagascar's biodiversity is concentrated. There the vision is to create corridors in excess of several million hectares, although the single largest existing protected area is Masoala National Park covering only 230,000 hectares (572,700 acres). Perhaps the best example of a forest ecosystem corridor is the Zahamena-Mantadia Corridor, which connects two of the country's most important parks—the 63,800-hectare (158,860 acres) Zahamena National Park and the 10,000 hectare (24,900 acres) Mantadia National Park—and would cover some 450,000 hectares (1.1 million acres) when completed. Farther to the south, the Ranomafana-Andringitra Corridor will eventually cover some 180,000 hectares (448,200 acres). Eventually the idea would be to have what Alison Jolly, one of the leading advocates for conservation in Madagascar, has called "a string of pearls"—a series of corridors around

the periphery of the island where much of the remaining natural vegetation is to be found. This approach would ensure the long-term survival of this country's wonderful biological heritage. Some of the new protected areas being proposed are mini-wilderness areas in their own right, perhaps the best example being the magnificent Makira Forest in northeastern Madagascar, which covers some 350,000 hectares (871,500 acres) and is contiguous with the 230,000-hectare (572,700 acres) Masoala National Park on the peninsula of the same name. Within these corridors, there exists the possibility of declaring "wilderness core areas," which would be off-limits to tourism and restricted to only the most important forms of scientific research.

The fact that Madagascar has seen human presence for such a short time—it was colonized at about the same time as many of the islands of the central Pacific—means that people have not had enough time to even explore the entirety of the forests of the island, particularly in the east. Indeed, for the first few hundred years of occupation of Madagascar there is no evidence that humans lived in highland or forested areas at all. Although not large by neotropical or central African standards, it is still possible to explore forested valleys, particularly those with dense vegetation high on the slopes of mountains such as Marojejy and Andringitra, that have in all likelihood never been visited by humans. Rural Malagasy people do visit forests to hunt and collect forest products, but these highland valleys do not hold much in the way of interesting prey or forest products, and the vegetation is so dense that one has to crawl on one's belly in many areas. Although such areas are probably quite small, in the tens or low hundreds of hectares, the idea that such genuine wilderness areas still exist is very inspiring, and is a phenomenon unlikely to be duplicated in much of the rest of the tropics, which have seen human habitation for much longer. As befits the nature of these sites, their fauna and flora are very poorly known, and they have yielded a startling range of new species of insectivore and rodent, with several new genera and around 20 new species over the last 15 years, and even new primates, a total of 19 since 1994 and with several more awaiting formal description. Doubtless there is much more to be learned about these mysterious valleys.

The fact that one can think about actual and potential wilderness in what is often considered to be the classic highly impacted biodiversity hotspot, once again gives us hope for the future. **IJW**

Figure 4—Ring-tailed lemur (*Lemur catta)* basking in the early morning sun, Berenty Private Reserve, Madagascar. Photo by Russell A. Mittermeier, Conservation International.

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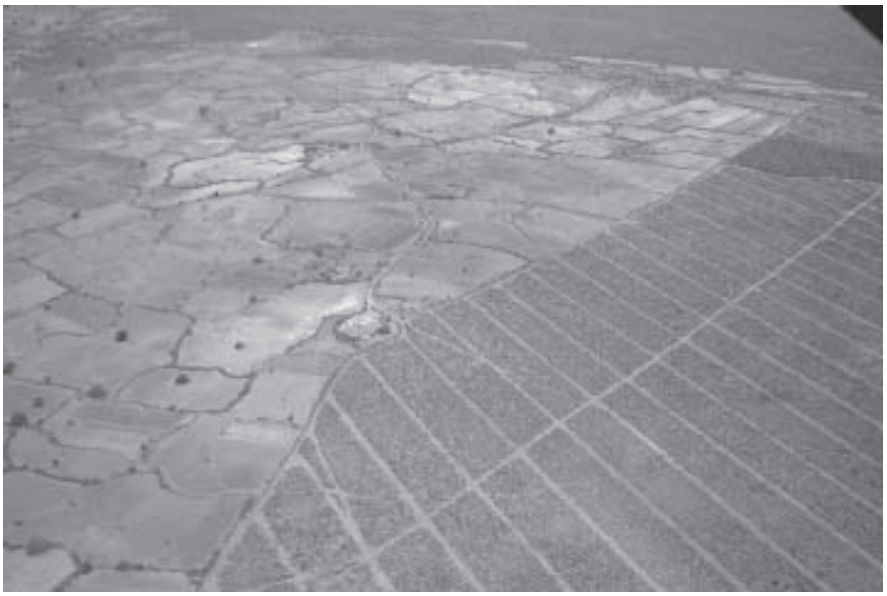

Figure 5—Sisal fields along the Mandrare River, Madagascar. Photo by Russell A. Mittermeier, Conservation International.

Announcements and Wilderness Calendar

COMPILED BY STEVE HOLLENHORST

Eight New World Heritage Sites Designated

Fossils of whales with legs, the world's biggest meteorite impact site, the deepest fjords, vast tropical forests, and outstanding marine sites. These are among the eight new natural World Heritage sites designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Committee, which met in Durban, South Africa, in July. They include Wadi Al-Hitan/Whale Valley (Egypt), the Valley of Flowers National Park (India), Shiretoko (Japan), the Islands and Protected Areas of the Gulf of California (Mexico), West Norwegian Fjords (Norway), Coiba National Park (Panama), Vredefort Dome (South Africa), and Dong Phayayen-Khao Yai Forest Complex (Thailand). The international committee of 21 countries unanimously approved IUCN's recommendations for inscribing these sites on the prestigious World Heritage List. "These new World Heritage sites illustrate the global importance of preserving marine biodiversity for our future well-being, especially commercial fish stocks and endangered species," said David Sheppard, head of the IUCN Programme on Protected Areas and the IUCN delegation in Durban. For more information on the designations, visit http://iucn.org/en/news/archive/2005/07/new_wh_sites_designated.pdf.

Warnings about Grazing Impacts Altered by Politicians

The Bush administration altered critical portions of a scientific analysis of the environmental impact of cattle grazing on public lands before announcing relaxed grazing limits on those lands, according to scientists involved in the study. A government biologist and a hydrologist, who both retired this year from the Bureau of Land Management (BLM), said their conclusions that the proposed rules might adversely affect water quality and wildlife, including endangered species, were excised and replaced with language justifying less stringent regulations favored by cattle ranchers. A BLM official acknowledged changes were made in the analysis but said they were part of a standard editing and review process and were based on "good science." Critics often complain that the Bush administration has made a practice of distorting scientific studies to weaken regulations to serve its political objectives. Grazing regulations, which affect 160 million acres (64.3 million hectares) of public land in 11 western states, set the conditions under which ranchers may use that land, and guide government managers in determining how many cattle may graze, where, and for how long without harming resources. Source: *Los Angeles Times*; more at_http://seattletimes.nwsource.com/html/nationworld/2002340217_graze18.html.

Goodbye Gaylord: Founder of Earth Day Dies

Former Wisconsin Senator Gaylord Nelson's best known achievement is the founding of Earth Day in 1970. Described by *American Heritage Magazine* as "one of the most remarkable happenings in the history of democracy," Earth Day made environmental protection a major national issue. A distinguished and influential public servant, Nelson served 10 years in the Wisconsin Senate, was twice elected governor of Wisconsin, and, in 1962, began an 18-year career in the U.S. Senate. Senator Nelson's many achievements include legislation to: preserve the 2,000-mile (3,225 km) Appalachian Trail; mandate fuel efficiency standards in automobiles; control strip mining; ban

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the use of the pesticide DDT; ban the use of 245T (agent orange); and creation of the St. Croix Wild and Scenic Riverway and the Apostle Islands National Lakeshore. Senator Nelson also cosponsored the National Environmental Education Act and wrote legislation to create the Upper Great Lakes Regional Commission and Operation Mainstream/Green Thumb, which employed the elderly in conservation projects. He is the recipient of numerous awards, including two from the United Nations Environment Programme. Gaylord Nelson became counselor of The Wilderness Society in January 1981. In his 14 years at The Wilderness Society, Nelson focused his efforts on protecting America's national forests, national parks, and other public lands. Source: www.Earthday.net.

Four Wilderness Bills Passed by U.S. Senate

The U.S. Senate unanimously passed wilderness legislation that will permanently protect thousands of acres of roadless wildlands in California, Washington, Puerto Rico, and New Mexico. "Today's unanimous vote in the Senate is yet another sign of the growing national support for protecting our country's remaining wild places," said William H. Meadows, president of The Wilderness Society. "Our Senators have done a great job moving these important measures through the process. We hope that the House of Representatives will follow the Senate's lead and act quickly to protect these special places." "In addition to these four efforts there are active wilderness campaigns across the country that continue to gain momentum," said Meadows. "We hope to see lawmakers setting aside other special places before the end of this Congress." The four bills that were passed by the Senate include federal lands in the coastal area of northern California; the Ojito area of New Mexico; the Wild Sky area outside of Seattle, Washington; and the El Toro region of Puerto Rico. Source: The Wilderness Society (http://www. wilderness.org/).

Publication Provides Tool for Monitoring Wilderness Character

What is wilderness character? Why monitor wilderness character? How will this monitoring benefit a specific wilderness? What does this monitoring consist of and how will it be used? How will this monitoring affect staff time and budget? How will this monitoring be implemented? These are the important questions addressed in a new USDA Forest Service publication entitled ***Monitoring Selected Conditions Related to Wilderness Character: A National Framework*** by Peter Landres, Steve Boutcher, Linda Merigliano, Chris Barns, Denis Davis, Troy Hall, Steve Henry, Brad Hunter, Patrice Janiga, Mark Laker, Al McPherson, Douglas Powell, Mike Rowan, and Susan Sater. The purpose of the publication is to improve wilderness stewardship by providing a tool managers can use to evaluate how selected actions and conditions related to wilderness character are changing over time. Many wilderness field and program managers perceive a steady erosion of wilderness character, yet there is no consistent means for describing this loss or positive stewardship outcomes. A national set of core indicators allows compilation of information at local, regional, and national levels. Improvement in wilderness stewardship must occur at the local level, but the ability to compile information at regional and national levels provides a powerful communication tool essential to make the case for wilderness stewardship needs. This monitoring framework also improves wilderness stewardship by more clearly articulating what wilderness character means, which may help managers evaluate proposed actions and improve agency performance measurement and policy review. The publication is available at http://leopold.wilderness.net/pubs/544.pdf.

Mapping Last of the Wild

Where is the last of the truly wild? The Wildlife Conservation Society, with the Center for International Earth Science Information Network at Columbia University, partnered with National Aeronautic and Space Administration scientists in the Last of the Wild Project to assemble satellite and land use data to plot the extent of the global Human Footprint. The Human Footprint is a quantitative analysis of human influence across the globe. In this map, human impact is rated on a scale of 0 (minimum) to 100 (maximum) for each terrestrial biome. A score of 1 indicates the least human influence in the given biome. However, because each biome has its own independent scale, a score of 1 in a tropical rain forest might reflect a different level of human activity than in a broadleaf forest. The collaborators chose four types of data to measure human influence: population density, land transformation, human access, and power infrastructure. The result is colorful maps where the zones closest to pristine pop out as patches of leafy green. Worldwide, the project found that only 17% of land is still virtually untouched—mostly because it is inhospitable to humans. In areas capable of growing basic crops, and therefore most able to support people, untouched lands have diminished to just 2% of the total. Alaska holds the vast majority of least altered lands in the United States. In the more settlement-friendly lower 48 states, the wildest areas have become islands ringed by interstates, farms, towns, and cities, making up only 0.9%

of land. In the lower 48 states of the United States, four of the wildest areas stand out:

- *Jarbidge Wilderness* (Idaho, Nevada). Heavy grazing in the 20th century damaged soils; mining was also prevalent early in the century. Grazing is now limited and recreational use is light, owing to its remoteness, so the wilderness is recovering well. It has some of the best air in the United States; also good water quality.
- *Central Idaho Wilderness* (Idaho). A crown jewel of American natural areas. National forest lands surround protected wilderness zones in a rich, self-sustaining ecosystem. A recent Forest Service study found this area to be the healthiest part of the Columbia River basin. There is little pressure from sprawl or recreational development, given the rugged and remote terrain. But logging and road building on national forest lands are possible.
- *Endless Mountains and Grand Canyon of Pennsylvania* (Pennsylvania). A rugged area in north-central Pennsylvania that includes the Tioga State Forest; home to elk, bald eagles, and other wildlife. Deer overpopulation; mine waste in the watershed. A once busy railway through the canyon is now a trail. The canyon area is protected wilderness. State officials are working with nearby communities on sustainable development.
- *Texas Grasslands* (Texas). A coastal prairie along the Gulf of Mexico, about 1% of the wild grassland remains, in patches as small as 10 square miles (3.8 square kilometers). These areas are being rapidly degraded. Three percent of Texas land is under public control; conservation efforts rely mostly on private landowners.

For more information and additional maps, visit http://www.ciesin.org/wild_areas/.

Book Review

How Should America's Wilderness Be Managed?

edited by Stuart A. Kallen. 2005. Greenhaven Press, Farmington Hills, MI. 125 pp., $19.95 (paperback).

The extensive At Issue series published by Greenhaven Press addresses a wide range of contemporary social issues in America, from Do Animals Have Rights? to Gay Marriage to Is Racism a Serious Problem?. This series is designed to focus a wide range of viewpoints onto a single controversial issue and provide in-depth discussions by leading advocates. In each small book, previously published material is used to highlight various components of each issue.

How Should America's Wilderness Be Managed? begins with a reprint of a paper published in the *International Journal of Wilderness* in 2001. Hendee and Dawson's paper documenting 17 threats to wilderness provides an excellent introduction to the challenges facing wilderness managers, The following chapter challenges their view that wilderness management should be in public hands, suggesting that free market forces in the private sector are best suited to effectively manage wilderness.

These first two chapters serve as a template for the remaining seven specific issues addressed in the next 14 chapters. That is, one chapter extolling one opinion on one issue is followed by another chapter providing an alternate or opposing view on the same issue. The question of whether public or private management of wilderness is more effective is followed by chapters on (1) road development in wilderness, (2) the impact of George Bush's new forest policies, (3) oil drilling in the Arctic National Wildlife Refuge, (4) logging in the Tongass National Forest, (5) the impacts of coal bed methane drilling, (6) ORVs in wilderness areas, and (7) the ethics of "monkeywrenching" in protecting the natural environment.

Although some fascinating and important topics are covered in this book, a focus on wilderness is not always evident; that is, whereas some chapters deal specifically with designated wilderness, other relate to protected areas or the natural environment more generally. Like all series of this type, this book is also weakened by the inability of each opposing chapter to directly address the points made in the previous chapter. Also, in order to keep the price of books in this series low, the chapters have been edited for length, and longer articles that could provide more in-depth analysis of the various issues are not included.

Despite the serious shortcomings of this type of book, *How Should America's Wilderness be Managed?* succeeds at introducing the complexity of issues involved in wilderness management, addresses some key wilderness issues, and forces the reader to consider both sides of each issue raised. The importance of political ideology and personal and societal values in deciding how wilderness should be managed is illustrated well—although not directly mentioned—in this book. It would be a useful reference source for high school and perhaps entry-level undergraduate students, and would serve well as a lightning rod for further discussions on the important issues raised.

Review by JOHN SHULTIS